Experience goal-driven design:

A design tool for exploring and defining experience goals

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Master's Thesis | 2020

Aalto University
www.aalto.fi
Master's thesis for Master of Arts

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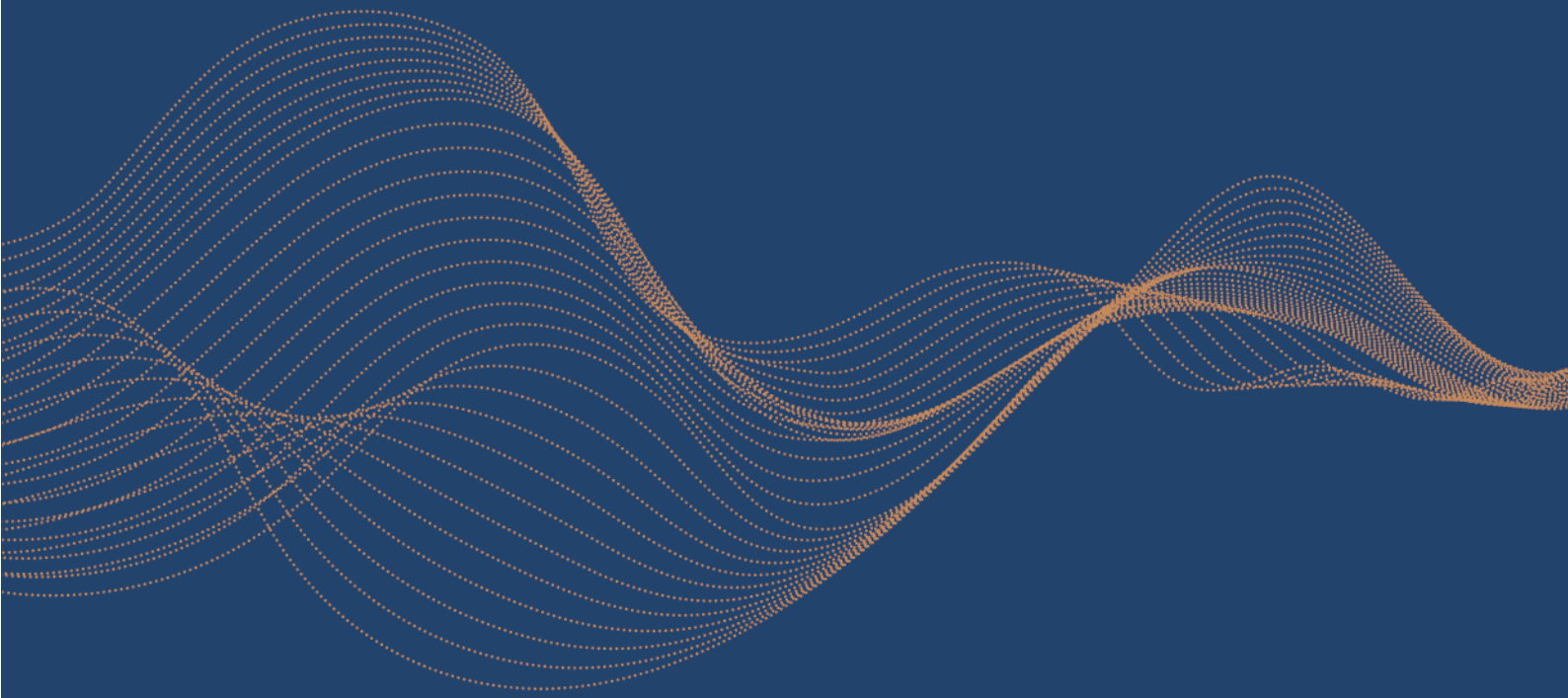
School of Arts, Design and Architecture
Department of Design
Programme: Contemporary design
Year: 2020
Language: English



“It is useful to remember occasionally that life unfolds as a chain of subjective experiences. Whatever else life might be, the only evidence we have of it, the only direct data to which we have access, is the succession of events in consciousness. The quality of these experiences determines whether and to what extent life was worth living.”

Mihaly Csikszentmihalyi

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ABSTRACT

Experiences are the only evidence one has of existence. They are inevitable, dynamic, and context-dependent, yet their quality determines whether one's life is worth living. Experiences shape emotions, memories, as well as personalities. They hold the superpower to lead one's life towards flourishing and well-being. Designing for meaningful experiences is the objective behind Experience-Focused Design (XFD), where the challenge for designers is to begin and keep the experience as the spotlight throughout the iterative design process. An instrument at designers' disposal is a set of Experience Goals (Xgoals), high-level design objectives, which hold positive experiential characteristics at the core.

However, as research and the complex nature of experience suggests, the process of defining Xgoals, which initiates the design activities, proves to be a difficult task for designers due to the focus shift from the traditional problem-solution to experience-driven mindset. Therefore, this thesis recognizes the need for a design tool aimed to facilitate the Xgoals definition process and offer an explorative space for Xgoal ideation. By addressing this need, this thesis seeks to aspire and empower designers to make their first steps towards designing for experiences.

This thesis' journey began with a theoretical background providing the backbone and key aspects for the followed activities: Xgoal mapping, design tool creation, and the tool's evaluation. Through a questionnaire and semi-structured discussions, a pre-selected list of Xgoals were mapped to human psychological needs, which are identified as a source of Xgoals. The outcomes of Xgoal mapping and key aspects derived from the theoretical background paved the path for the creation of the design tool. It was later on evaluated with eight designers. The data for the evaluation of the design tool was collected through feedback forms, observations, and thematic interviews. The results support previous XFD research claims, such as the difficulty of grasping the experience-driven process, especially during the Xgoal definition phase, and that the high-level Xgoals keep the focus on experiential aspects.

Despite the supportive findings, the results suggest that the concept design tool is able to facilitate the Xgoal definition process by providing visual guidance for designers, who also found the tool to be explorative and empowering. Moreover, the findings support the author's initial assumptions about utilizing the created design tool since the results indicate designers' interest in implementing it in future projects.

This thesis contributes to the design research by introducing a novel design tool to facilitate and explore Xgoals for designers' creative journey towards making meaningful experiences a reality and thereby address the highest known design goal: human flourishing and well-being.

Key words:
Experience-Focused Design, Experience-goals driven design, Experience goals, Design tool, Psychological needs, Designers, Experience goals definition, Experience goals mapping

ACKNOWLEDGMENTS

It is a lovely sunny morning at 6AM. The light rays are spreading all around me and I find myself writing these last lines. It is hard, I admit it. It is difficult to think that it is over. I did not know that I would enjoy writing this thesis so much and already feel like I miss it. This topic has provided an abundance of valuable insights and I'm motivated to continue growing in the same direction.

It feels unreal that my journey at Aalto University is coming to an end. This four-year adventure has given me wings to explore uncharted territories and form new bonds, which I will always cherish. Thank you Aalto University for giving me the freedom to explore my overreaching interests, for opening the doors of endless opportunities, and helping me personally and professionally to grow into the best version of myself, so far. And now that I have wings and know the direction, it is time for a new adventurous journey. But before I depart, I would like to sparkle some glitter of appreciation around.

I want to take a moment and express my gratitude to my thesis supervisor and advisor, Virpi Roto, who not only supported me through this thesis process but also her positive energy and feedback were a catalyzer for my inspiration and motivation. A sincere thank you is still not enough but it is a great start. Our emails have mostly ended with: sending you good vibes and energy. So now I want to leave you a message here. Whenever you are reminded of me, know that I am always sending you good vibes and energy. After all, positive experiences do contribute to one's happiness, even in such small doses.

These are strange times. We all find ourselves in an unusual situation with the outgoing COVID-19 pandemic. Despite that fact, I was still able to find participants for my evaluation process, who were eagerly ready to help. I want to let you know that without your help, I definitely would not have been able to write these final words now. Thank you not only for your participation but also for the perseverance and excitement you showed during the workshops.

At the beginning of this thesis process, it was challenging to know which direction to take since everything appeared intriguing and for an explorer like me who wants to research it all, it can be quite frustrating. As if I'm in a candy shop and my cravings for chocolate are unbearable, and if it was possible to eat all of the chocolate at the same time, I would have done it. With this thesis, I had an unofficial research advisor who dedicated his time to direct me and explain to me, perhaps for him, fundamental things about research, but for me, it was the moment when all the puzzle pieces in my mind formed the "big picture". Thank you Antti Surma-Aho.

Besides an unofficial advisor, I also had an incredibly dedicated reviewer who lifted my spirits with embedded funny comments and was the pillar to which I could always lean on. You pushed me and comforted me when I most needed it and not only for this thesis process but as long as I can remember. I greatly appreciate your devotion and will never forget what you did last April BBM.

And last but definitely not least, I want to thank my brother uncle, and mother, who have been supporting me all the way from Bulgaria, sending me Bulgarian delights to cure my homesickness. For the long conversations full of motivational and encouraging talks, as always.

Oh, and one more. For you, casual reader, thank you and enjoy reading this as I much as I enjoyed writing it.

ABBREVIATIONS

XFD	experience-focused design
XD	experience design
UX	user experience
Xgoal	experience goal
PN	psychological need
RQ	research question

1 INTRODUCTION

Since ancient times, ceremonies, rituals, drama, and architecture were all designed to evoke a specific type of experience (McLellan, 2000). Experience design has always existed in mankind's creations, but only in the last two decades has it become the focal point for design practices. According to Hassenzahl (2013), experience design is an approach to design that places the spotlight on facilitating pleasurable and meaningful experiences, and they are the driver for the design activities that follow. However, since experiences are presented as "…dynamic, context-dependent, and subjective" (Law;Roto;Hassenzahl;Vermeeren;& Kort, 2009) and open for interpretation, they cannot be directly designed, but the circumstances and conditions to elicit them can be created through design (Preece, Rogers, & Sharp, 2015).

Experience-Focused Design (XFD) challenges designers to launch their activities with the human experience in mind first (Desmet & Schifferstrein, 2011), and abandon all the functional, technological, usability, or aesthetic objectives, in early product development stages (Hassenzahl, 2010). Additionally, leaving behind the more material requirements keeps the final design outcome open for anything which answers the intended experience. At first glance, the XFD's primary objective, to think experience first, appears straightforward; and yet it still provides difficulties for designers. A large portion of the challenges are related to designers' native interests to focus on the tangible sides, which is usually the product. Therefore, XFD requires a daring shift towards an experience-driven mindset, where the experience comes first above all else and is the driver throughout the iterative design process (ibid.). Furthermore, Press & Cooper (2016) depict the contemporary role of designers as "enablers of meaning", and design as a value-driven creative activity which additionally stresses the demand for change in the design processes.

An advantage of XFD, according to Jensen (2014), is that it leads to novel design areas where other approaches such as problem-solution can hardly reach. The importance of experiences has been recognized from various disciplines, such as psychology, business, marketing, and economy. From the perspective of positive psychology, Hassenzahl (2010) outlines that positive experiences hold the power to make people

happy and motivate one's future actions. In a broader sense, Csikszentmihalyi (2014) emphasizes that the only evidence one has of existence are the experiences, and their quality determines one's life as "worth living". From a design perspective, experiences materialize whether supported by designers' intention or not (Hassenzahl, 2013).

A crucial building block for successful experience design outcome is determining what kind of experiences to design for, through defining Experience Goals (Xgoals). A set of well-defined experience goals framed by designers and multidisciplinary teams in the early phases carries out the intentional spotlight on the experience during the product development and marketing process (Kaasinen, 2015). Xgoals' objective is to concentrate the design on building distinct positive experiences and transform the intended experience "into an articulated and formalised design aim"(Lu, 2018). Roto and Lu (2014) define Xgoal as "the intended momentary emotion or the emotional relationship/bond that a person with the designed product or service". Xgoals are the primary design tool of Xgoal-driven design approach, which can be divided into two phases: Xgoals definition and realization.

According to Roto (2017), Xgoals' definition process is the phase that brings obstacles. She also states that studies should focus on "investigating the different formats, level of abstraction, and hierarchy of representing experience visions, Xgoals, and design implications". This initial definition process toward designing for experiences is currently labeled as the "fuzzy front end" (Varsaluoma;Kaasinen;& Lu, 2015). In a study, Varsaluoma (2015) presents a four-step guideline to shed light on the Xgoals definition process. However, it lacks a clear format for the Xgoals definition. Previous studies indicate that vague and poorly defined Xgoals, currently utilized in the industry, are unable to guide the iterative design process towards a successful experience design outcomes (Roto, et al., 2017). Therefore, this thesis recognizes the Xgoals definition process as blurry and in need of further clarifications.

Furthermore, Hassenzahl (2010) highlights that the meaning of experiences derives from the psychological needs

(i.e., self-actualizing, relatedness, pleasure) they fulfill and utilizes them to categorize experiences (Hassenzahl, et al., 2013). Similarly, from the user experience perspective, Partala (2012) studies the structure of the most satisfying experiences in terms of the phycological needs they fulfil. From the side of Xgoal-driven design, Lu & Roto (2014) indicate the ten basic psychological needs as a source of Xgoals, however no further studies investigate their relationship.
This thesis aims to address the above-mentioned gaps in XFD research and define the following research questions:

Research question 1 (RQ1)

How can existing Xgoals be mapped to basic psychological needs?

Research question 2 (RQ2)

What kind of tool can aid designers to define and Xgoals?

To address the two defined research questions, this thesis presents six chapters. The **Related studies** chapter explores existing research in the XFD field and especially on Xgoals. As the building block of this thesis, this chapter's primary objective is to gain a thorough understanding of Xgoals and the current challenges related to their definition. The derived key aspects are then employed in an Xgoals mapping process in **Chapter 3**. Where, with the support of a questionnaire and structured discussions, a collection of preexisting Xgoals are mapped to ten psychological needs. Their connection is further explored and the results of this process are imparted. The outcomes of this process sheds light on the **RQ1**. With the aid of both previous chapters, **Chapter 4** lays out a set of design criteria for the creation of a design tool and introduces the main outcome of this thesis- the AimX experience design tool. In **Chapter 5**, the design tool is placed in designers' hands for an evaluation process, for which two workshops were arranged. During the workshops, the author collected data through thematic interviews, observations, and feedback forms. After analyzing the data through categorization, the

results are presented in four clusters. All five chapters collectively contributed to the undertaking of the RQ2. **Chapter 6** is where the puzzle pieces from the previous chapters unite to answer **RQ1** and **RQ2**. Additionally, chapter 6 discusses possible future studies and the limitations of this thesis.

2 RELATED STUDIES

This chapter presents a literature review of experience-focused design and more explicitly targets the comprehension of existing knowledge for Xgoals. The main objective of this chapter is an in-depth understanding of experience goals and highlighting the gaps mentioned above, which this thesis is attempting to address. Firstly, it presents the field of experience-focused design. Then it outlines existing approaches and design tools along with their present challenges. Secondly, it turns the attention to an extensive understanding of experience goals, and finally, it looks at the connection between Xgoals and basic human psychological needs.

2.1 EXPERIENCE-FOCUSED DESIGN

2.1.1 WHAT IS EXPERIENCE-FOCUSED DESIGN?

To grasp the concept of experience-focused design, the first required step is to comprehend the word experience. The origin of the word experience derives from the Latin "**expiriri**", meaning to try and risk, and it dates back to the 1580s (Harper, 2001-2020). As from then, an abundance of flavorful concepts and viewpoints exist in regard to what experience means (Hassenzahl, 2013). An article on experimental education presents a summary of studies on experience from various fields, such as neuroscience, anthropology, education, religious studies, and psychology where experience is described from a subjective perspective as "**… a complex interaction between body, sensory input, and neurological processing—a relationship with the world as humans encounter, interpret, and shape messages.**" (Fox, 2008). In user experience design research, approximately 270 researchers and practitioners from the industry and academia agree and state experiences as "**…dynamic, context-dependent, and subjective**" (Law;Roto;Hassenzahl;Vermeeren;& Kort, 2009). Furthermore, experiences are expressed as "memorized stories" and moment-by-moment experiences (Hassenzahl, 2013). As illustrated and supported above, experiences are complicated, and this thesis is not attempting to provide a clear definition but rather aims to maintain a broad perspective of its meaning. Thus, borrowing Lu's (2018) description derived from Merriam-Webber dictionary "**something personally encountered, undergone, or lived through**" is found as most suitable. After positive psychology initiated a shift in focus from behaviorism to studying happiness, human flourishing and well-being (Seligman & Csikszentmihalyi, 2000), design researchers follow the approach by turning the coin from designing solutions to designing possibilities (Jensen, 2014). A number of design concepts and approaches emerge from this deviation, influenced by the positive psychology principles.

Lu(2018), in a doctoral dissertation, introduces Experience-Focused Design (XFD) as an "**umbrella term**" to convene those approaches with the common objective towards targeting

primarily meaningful experiences in the design process and its outcomes. However, designing for experiences has existed since ancient times, ceremonies, rituals, and architecture. They were all designed to evoke a specific type of experience, but it is recently that it has become an actual focal point in design practices (McLellan, 2000).

According to Hassenzahl (2013), experience design is an approach to design that places the spotlight in facilitating pleasurable and meaningful experience, which are the driver for following design activities. However, since experiences are complex, subjective, and open for interpretation, they cannot be straightforwardly designed, but the circumstances and conditions to elicit them can be created through design (Preece, Rogers, & Sharp, 2015).

XFD challenges design practitioners to launch their design activities with the human experience in mind first (Desmet & Schifferstrein, 2011), and abandon all the functional, technological, usability, or aesthetic objectives in early product development stages (Hassenzahl, 2010). Additionally, leaving behind the more material requirements keeps the final design outcome open for anything which answers the intended experience. In other words, if a context is to design a food container, designers should not start with questioning the material for the manufacturing or the aesthetic properties but instead, focus on why is this food container needed and explore the underlying meanings it holds for users.

To design for experiences, design practitioners first need to decide on what kind of experiences to strive for (Desmet & Schifferstrein, 2011), hence Experience Goals are introduced (Lu & Roto, 2014) to the field and have become the center of an approach, namely Experience Goal-Driven Design (Xgoal-driven design). Xgoals are presented as a "**conceptual instrument that concretizes intended momentary emotion or the meaningful relationship/bond that a person has with the designed product or service.**" (Lu, Experience Goals in Designing Professional Tools- Evoking meaningful, 2018). Desmet and Schifferstein (2011) distinguished two interlinked main challenges: 1) Xgoal setting as the first phase, in which designers are to select experiences to aim for; 2) Xgoal

realization, the second phase, in which the targeted Xgoals realization is in question. To gain a better understanding of the process utilized in the Xgoal-driven design approach, the developers provide an illustration, exhibited below (Figure 2-1).

Furthermore, Xgoal-driven design, the development of which dates back to 2011, has been utilized in numerous collaborative projects between Aalto University and the Finnish industry. Well-known companies, such as Kone, Fastems, Rolls-Royce, and VTT have collaborated with design students from the course Experience-driven design lead by Virpi Roto. Between 2011 and 2017, the projects produced outcomes, tackling challenges related to User Interface (UI), product lifecycle, service touchpoints, events, packaging design, etc.

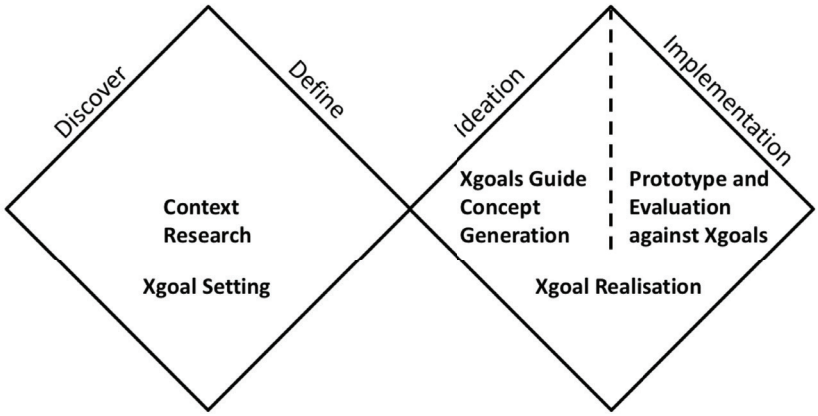

Figure 2-1- Xgoal-driven process (Lu, 2018)

2.1.2 THE IMPORTANCE OF EXPERIENCE-FOCUSED DESIGN

The quality of the experiences which our lives unravel, as a series of events, "**determines whether and to what extent life was worth living**" as experiences are the singular confirmation we all have of life (Csikszentmihalyi, 2014). This particular introduction of a chapter in Csikszentmihalyi's book provides

one with thought-provoking information and emphasizes the significance of experiences in our lives. Thereby, experiences did not become valuable now, they have always been.
Viewing experience design from a psychological angle, Hassenzahl (2010) pinpoints three reasons for recognizing experience as the focus for design activities. Firstly, material possessions cannot compare to the value of experiences, in terms of the effect on our happiness levels, since experiences have a more intimate connection with our inner selves. Secondly, memories, shaped, and interpreted from one's sequential life experiences are vital to our identities. Lastly, experiences motivate future actions as they bring meaning to one's life.

The relevance of experience has been discussed in other fields. In business and marketing, shaping memorable and significant customer experiences has proved its value in terms of forming loyal relationships with customers (Korhonen, 2015). Additionally, the economy has moved from service delivery to "**experience economy**", in which consumers choose a product not based only on its features but rather on the facilitated intended experience (Rossman & Duerden, 2019).

In design research targeted towards the shift from problem-solution approach towards designing possibilities, Jensen (2014) underlies how to design activities, starting and ending with the experience in focus, can lead to novel design areas where the traditional problem-solution way of thinking cannot reach. Subsequently, after addressing some of the points as to why XFD is important in several fields, it becomes imperative to direct the focus towards the industry and design practices. As stated by Roto (2017), in an explorative study about utilizing Xgoals in industrial systems, "**many technology companies are willing to shift their focus towards experience-driven design**." However, "**reports on real-life cases about the utilization of this design approach are rare**." (ibid.). Furthermore, at first sight, the XFD's ideology to position experience as the primary objective, appears straightforward, yet it brings obstacles to designers' and engineers' activities (Hassenzahl, 2010). To clarify, Hassenzahl further refines the obstacles as swirling around the common-practice for designers to consider mainly the tangible aspects of an experience. However, "**there**

is no way around it". Experiences will materialize whether they have been intended by the designer or not (Hassenzahl, 2013), thereby designers hold responsibility which they should recognize.

In this ever-changing world, design and designers' role is reshaping. In a recently published book, Press and Cooper (2016), introduced design as a value-driven activity where designers are "**makers**", "**enablers of meaning**", "**cultural intermediary**", and opportunistic entrepreneurs. The authors underlies and urged designers to "**look at the world, not as an amorphous, anonymous group of consumers, but as a dazzlingly diverse collection of individuals all trying to find their way- to find meaning and purpose in the world…**".

2.1.3 EXPERIENCE-FOCUSED DESIGN APPROACHES AND DESIGN TOOLS

Positive psychology, alongside numerous diverse disciplines (sociology, neuroscience, economy, etc.), provide a stream of information that act as a building block for the creation of diverse design approaches, methods, and techniques in the field of XFD for designers. Within the XFD, as presented in Lu's (2018) doctoral dissertation, some of the approaches, which follow the high-level objective to focus on experiences before any other material requirements, are emotional design, experience-based design, design for meaningful experiences, and positive design. The design approaches have presented tools or frameworks, most of which are theory-based. In this thesis's literature review, Positive Design Framework (Desmet P. M., 2013) and the three-level hierarchy of goals (Hassenzahl, 2010) will be presented in more detail.

2.1.3.1 The three-level hierarchy of goals

One essential conceptual model of user experience design is the three-level hierarchy of goals (Figure 2–3), presented by Hassenzahl (2010). All three levels collectively construct a

successful experience design, although the direction in which they are followed in the design process matters the most. The first step is to discover the motives behind the action, which is the "**why**" level. Being at the highest level, it is the one that creates deep personal meaning or ,in other words, be-goals. The middle level in this hierarchy model refers to the action itself, and the lowest level targets the specific operations for fulfilling the chosen action. In other words, if one is about to visit a gym facility to perform pushups in order to build a stronger and healthier body, the latter falls into the highest level since it acts as a motivation for the action (visiting a gym facility), and pushups are the specific exercise or operation, which brings them to the lowest or the motor level goals. To additionally clarify, experience designers start by identifying the "**why**" or underlying the high-level need. Followed by exploring the pragmatic do-goals or what can fulfill the set needs, and finally uncover the motor goals or how the desired outcome is to be achieved.

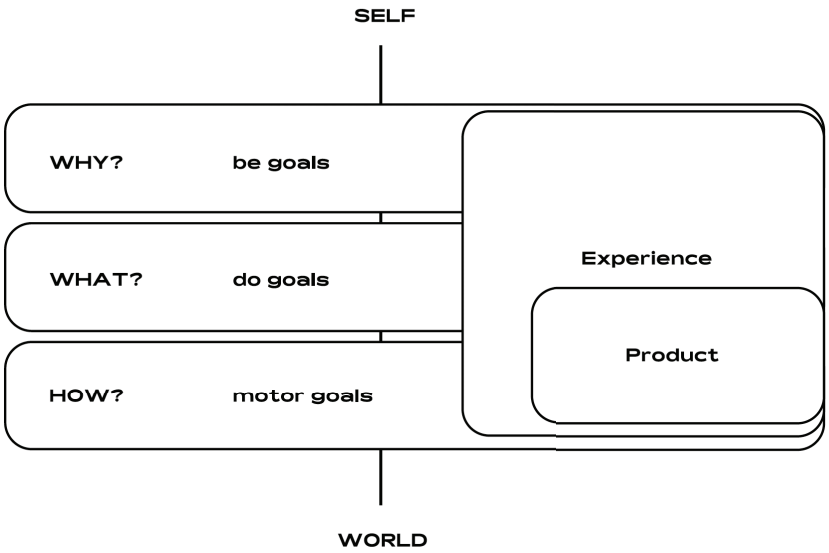

Figure 2 -3- A three-level hierarchy of goals (Hassenzahl, 2010)

Usually, the product design begins with the "**what**" and "**how**" level and focusing on the more pragmatic qualities, rather than designing with the be-goals in mind. The latter are the goals, which correlate to in-depth meaning, value, and need (Lu, 2018). The universal psychological needs (Sheldon, Kasser, Elliot, & Kim, 2001), some of which are autonomy, security,

pleasure, relatedness, have been indicated as the sources for the be-goals and their gratification directly linked to happiness (Hassenzahl, Diefenbach, & Göritz, 2010).

2.1.3.2 Positive design framework& Design for Happiness Deck

The Positive Design Framework, developed by Desmet and Pohlmeyer in 2013, depicts designing for human flourishing, by presenting three ingredients as essential (Figure 2–4). One of the ingredients is experiencing momentary positive effects or, in other words, Design for Pleasure. The second one is defined as Design for Personal Significance, concentrated on targeting subjective values and linked to one's achievements. And finally, the third ingredient, called Design for Virtue, is aimed at an individual's morals and addresses the question, "**Am I behaving honorably**?"

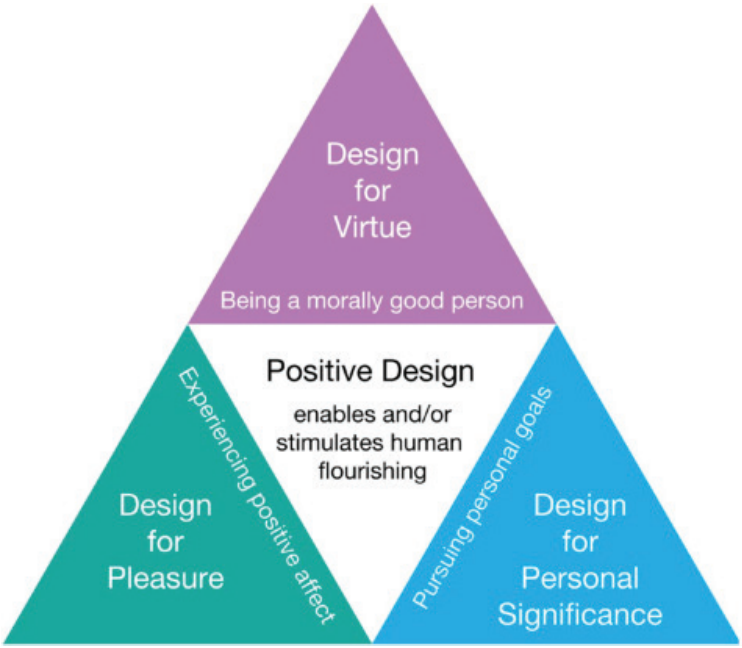

Figure 2 -4- Positive design framework (Desmet P. M., 2013)

All three ingredients can be a subject to design individually, but once achieved together, harmoniously stimulate the "**sweet spot**" (ibid.) also known as, human flourishing. The framework, inspired by positive psychology and philosophy, targets the overlap of moral values, individual endeavoring, and pleasure.

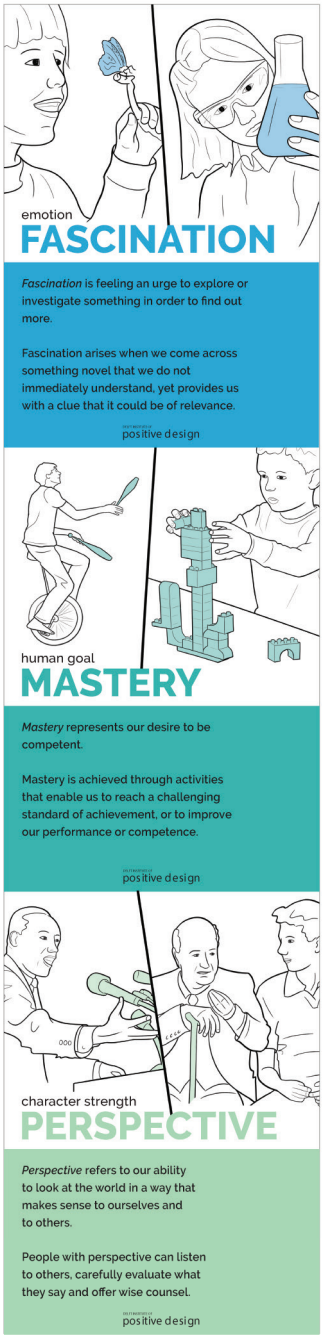

Figure 2-5- Examples from the three categories of Design for Happiness Deck (Desmet, Pohlmeyer, & Yoon, 2017)

Hence, the long-term goal of positive design is enabling human flourishing, which is also defined as eudaimonic.
Based on the Positive Design Framework, researchers at the Deflt Institute of Positive Design, have developed a series of design tools and models to aid design practitioners with this ambitious task to design for human happiness. One example purposed to break down "**…the seemingly overwhelming phenomenon of happiness into manageable components…**", is Design for Happiness Deck. The card deck consists of 72 cards, divided into three categories (pleasure, personal significance, and virtue) and is intended to help design practitioners and other design enthusiasts during the initial ideation phase of design towards designing for human happiness. Examples from the three categories are illustrated on the left side (Figure 2–5).

Positive psychology has been the main source of inspiration for the creation of design frameworks, models, and tools in the experience design field. Frameworks such as Positive Design Framework (Desmet P. M., 2013), the three-level hierarchy of goals (Hassenzahl, 2010) are available to aid designers in understanding the holistic nature and goals of aiming towards designing for experiences. However, the author argues, even though the methods and tools are suitable for comprehending the essence and holistic goals of XFD, they do not present a concrete step-by-step path for designers to shift their mindset from the traditional problem-solution thinking to "**experience before product**" (Hassenzahl, 2010).

Therefore, a gap between designers and the utilization of XFD methods in the industry exists. A demand for more concrete, simplified, and approachable design tools aimed at shifting designers' way of thinking from the material to the abstract is required.

2.2 EXPERIENCE GOALS

2.2.1 EXPERIENCE GOALS OVERVIEW

To design for meaningful experiences, design practitioners' first challenging objective is to determine the experiences which they will be aiming at. In the Xgoal-driven design approach, Xgoals are the ones paving the path towards designing for experiences and are the first step design practitioners should take. Lu and Roto (2014), define Xgoals as "**…the intended momentary emotion or the emotional relationship/bond that a person has towards the designed product or service**". Xgoals are targeting the profound long-term experience, human flourishing, and well-being (eudaimonic directive), as well as the momentary emotional response (hedonic directive) (Mekler & Hornbæk, 2016). Additionally, as indicated by Lu (2018), positive experiences are at the heart of Xgoals. Therefore, designers are to transform momentary positive emotions and long-term eudaimonic properties of experiences "**…into an articulated and formalised design aim**" (ibid.). For instance, intrigue is a momentary emotional engagement, and proactiveness is a long-term goal; thereby, an example of Xgoal could be articulated as Intrigue for Proactiveness. In all studies under review in this thesis, design teams or researchers have defined not only a singular Xgoal but rather a set of goals to direct the design activities. A set of well-defined experience goals framed by designers and multidisciplinary teams in the early phases carries out the intentional spotlight on the experience during the product development and marketing process (Kaasinen, et al., 2015).

Moreover, Xgoals, encompass the creative design process with experimental aspects as the spotlight, tend to expand the design space while leading designers towards radical concepts, and stimulate critical thinking (Lu, 2018). Along with holding the role of a compass, Xgoals are a design tool exploited to communicate the selected experiences between stakeholders in collaborative projects (Varsaluoma;Kaasinen;& Lu, 2015).

The design tool aspires to support designers in the shift from traditional problem-solution thinking to experience-focused mindset. As well as to act as an initiator of design space exploration and human sense making. In regard to the design process, Xgoals dwell with other design goals, such as usability goals, and are a design instrument with the possibility to be utilized in various design methods. Additionally, Xgoal "**... serves as a backbone for query, explanation, and evaluation, adapting to a semi-structured approach to experience embodiment**", and have a dynamic character due to the iterative nature of the creative design process (Lu, 2018).

As previously reviewed (see 2.1.1), Xgoal-driven design consists of two phases. The first phase is the Xgoal definition, and the second one is Xgoal realization. This thesis is aiming to address the former, and therefore the literature review presented is focused mostly on the first phase.
Defining Xgoals to initiate the creative design process is a challenging task, referred to as "**the fuzzy front end of experience design**" (Varsaluoma;Kaasinen;& Lu, 2015), where designers' creativity and reflective deliberation engages into an iterative and collaborative process (Lu, 2018).

To underpin the Xgoals, a steppingstone is replying to the "**why**" question in order to discover the underlying motives behind the action. Lu (2018) further illustrates this point with an example:

"**…when designing for a coffee-related experience, designers should not immediately fix the interaction between one person and coffee machine in terms of good taste, convenience, and effectiveness. Rather, they need to think about why people need coffee, to have a refreshing beverage before work or to have a relaxing moment with families. They are two distinct reasons and hence result in two different experiences.** "

As noted form the example, Xgoals are answering the "**why**" and, as such, act as a motivator, thereby are positioned in the highest level on the three-level hierarchy model(see 2.1.3.1).
Based on a literature review and analysis of four industry cases, Kaasinen (2015), specifies five sources for Xgoal setting: Brand,

Theory, Empathy, Technology, and Vision. To shed more light, the Empathy approach is about an in-depth understanding of the user, and according to Varsaluoma (2015) is the source used most frequently as inspiration wellspring.

On the other hand, Hassenzahl (2010; Hassenzahl, et al., 2013) depicts a bond between human psychological need fulfillment and meaningful experiences. Additionally, basic psychological needs are also considered to provide "**high-level experience goals**" (Lu & Roto, 2014). It is beyond the scope of this thesis to map out the different sources of Xgoals, however, according to the review, this thesis understands basic psychological needs as the main source subsiding in the category of Empathy approach.

As a result of surveys, Varsaluoma (2015) presents the Experience Goal Elicitation Process to address the "**fuzzy front end**" of defining and in later phases of the design process aid with the evaluation of Xgoals. The findings of this study have been formalized in a table shown in Table 2–1. However, while the study's results provide some direction they lack a level of concreteness and do not offer any visual support for designers to grasp the process of Xgoals definition.

Instructions for defining and evaluating experience goals	
Describe, prioritize & choose	1. Use/choose methods and means to describe experience goals so that all stakeholders can create a shared and similar understanding. 2. Consider possible user requirements connected with the experience goals. You can also describe emotions or feelings the user is aimed to experience. 3. Describe goals precisely enough to make them actionable for designers in the design process. Describe also the reasoning behind the goals (why) as designers need to select the proper means of conveying (how) the experience (what). 4. Prioritize the experience goals to aim for and choose goals that can realistically be achieved (or at least targeted).
Communicate & iterate	5. Plan what means (e.g. artefacts) to use to communicate the experience goals for stakeholders. 6. Iterate the goals as you learn more throughout the design process. Revise what deliverables to use if you find better ways of communicating.
Measure & evaluate	7. If experience is measured, operationalize the experience goals and select appropriate (qualitative) metrics for evaluation. 8. Plan how to trace the later design solutions back to experience goals so that it is possible to evaluate the fulfilment of the goals in different phases of the design work.

Table 2–1- Instructions to support designers when defining and evaluating experience goals (Varsaluoma;Kaasinen;& Lu, 2015)

2.2.2 CHALLENGES

Since Xgoals hold a eudaimonic and hedonic qualities, both of which are often referred to as abstract and complex, and are relatively a new design tool, many obstacles for defining Xgoals are notable in current research studies. According to Roto (2017), the main difficulty for designers revolves around Xgoal definition. Possible future studies can focus on "**investigating the different formats, level of abstraction, and hierarchy of representing experience visions, Xgoals, and design implications**" (ibid.). Furthermore, in the industry, Xgoals are often vague and abstract, for example, "**WoW**" or "**good user experience**" (Kaasinen, et al., 2015), and as such are unable to guide the design process towards a successful experience design outcomes (Roto, et al., Utilizing Experience Goals in Design of Industrial Systems, 2017).

Currently, the only guide directed towards aiding design practitioners into the process of setting Xgoals is the Experience Goal Elicitation Process (Varsaluoma, Kaasinen, & Lu, 2015). The guide has an instructional nature and sheds light on the "**fuzzy front end**" (ibid.), however, it leaves the format of the Xgoals in the hands of designers without providing a more concrete format for setting the Xgoals. Despite designers' capability to define the format, the intended hedonic and eudaimonic characteristics of Xgoals have a higher chance to be omitted, resulting in vague experience goals incapable of directing the creative design process towards profound experiences.

Additionally, a notable link between Xgoals and the identified sources for their definition is present, however, no studies have been conducted to investigate the connection further. This thesis argues that investigating their link can provide researchers and designers with more concretized data regarding Xgoal definition and utilization.

Therefore, this thesis argues that the "fuzzy front end" of the Xgoal setting phase is in need for a more concrete tool, which can facilitate the shift from problem-solution thinking to experience. A tool which provides designers with a clear starting

point and a format for defining and positioning Xgoals. The second objective of this thesis is to initiate a mapping activity in regards to Xgoals and their relationship with one of the sources for defining Xgoals, namely the basic psychological needs.

2.3 EXPERIENCE GOALS AND PSYCHOLOGICAL NEEDS

To address the above-mentioned gap the present study seeks to further explore the connections between Xgoals and the basic human psychological needs..
According to the Self-determination theory, all humans strive for the fulfillment of universal psychological needs. In a study, Sheldon (2001) presents ten basic psychological needs (see fig.) and further explores their relationship with affect. One of the highlighted results shows that the extent of the need satisfaction is closely attached to the human perception of experiences to be as positive. Furthermore, in a field of Human-Computer interaction, Hassenzahl (2010) additionally examines the basic psychological needs as a wellspring of positive experiences with interactive technologies. The results indicate, a categorization of experiences is possible through the need they intend to fulfill (ibid.).

In UX research, need satisfaction has been associated with eudaimonic experiences. By empirically examining over two hundred reports related to positive experiences with technology, Mekler& Hornbæk (2016), link experiences to both hedonic and eudaimonic characteristic. However, they further distinguish,
“What we call eudaimonic experiences is related to need fulfillment, long-term importance, positive affect, and feelings of meaningfulness...
In contrast, hedonia is largely about “momentary pleasures”, such as unwinding and relaxing.”

The universal psychology needs, as previously discussed across the literature review (2.1.3.1 and 2.2.1), have been positioned on the highest “**why**” level of Hassenzahl’s three-level hierarchy model, and indicated as sources for Xgoal setting

phase of Xgoal-driven design approach (Lu & Roto, 2014). Similarly, as Lu (2018) has reported, Xgoal's definition starts with the question why.
Therefore, both Xgoals and basic psychological needs are inhibiting the same be-goal level, where the latter, in terms of hierarchy, is located higher. In addition, this thesis argues that a starting point for defining Xgoal should be selecting a basic psychology need in order to ensure the selected Xgoal possesses both eudaimonic and hedonic properties.
The next chapter maps out a preselected list of existing Xgoals to the ten psychological needs to address RQ1 in more detail and initiate further discussions related to the relationship of Xgoals and psychological needs.

2.4 CONCLUSION

The literature review presents, experiences as "**…dynamic, context-dependent, and subjective**" (Law;Roto;Hassenzahl;Vermeeren;& Kort, 2009) and design approaches focused on the experiences as a main objective of the design process and its outcomes fall into the Experience-Focused Design (XFD) process. Experience-focused design addresses experience as a primary focal point of the design process and leaving behind all material, functional, usability goals as only the means to evoke the targeted experience. According to Hassenzahl (2010), meaningful experiences have a direct connection to one's level of happiness, shape memories, and thereby one's identity. The importance of designing for experiences has been recognized not only in the design fields but also in various fields, such as economy, business, and marketing. However, from the industry's perspective, "r**eal-life cases about the utilization of this design approach are rare**." (Roto, et al., Utilizing Experience Goals in Design of Industrial Systems, 2017), and designers come across obstacles when it comes to utilizing XFD approaches due to the abstractive and intangible nature of experiences (Hassenzahl, 2010).

Positive psychology has been inspiring the development of a series of design frameworks and models in the XFD, such as Positive Design Framework (see 2.1.3.2) and the three-level

hierarchy of goals (Hassenzahl, 2010). However, the approaches are mostly focused on holistic understanding and goals rather than guiding designers into the shift from the traditional problem-solution thinking to experience focused mindset.

The Xgoal-driven design approach of XFD, provides designers with a tool, namely Xgoals, which are defined to have eudaimonic and hedonic characteristics. Or in other words, addressing the long-term experiences goals towards human flourishing and meaning (e.g., autonomy), and momentary pleasurable experiences (e.g., relaxation) (Lu & Roto, 2014). The design process is initiated by setting Xgoals, to keep the focus on the experience through the iterative nature of the design activities, followed by utilizing them in practice. From an industry perspective, Xgoals are often vaguely defined (e.g., "WoW"), therefore not holding any long-term aims (eudaimonic), resulting in the inability to guide the design process (Roto, et al., 2017). Addressing the challenges related to Xgoal setting, Varsaluoma, Kaasinen& Lu (2015), present an instructional table model (see 2.2.1) to aid designers. Despite the presence of a four step instructional model, the author, argues that the format of Xgoals is undefined, thus resulting in poorly defined Xgoals. As a result, this thesis's primary objective is to focus on resolving the identified gap by providing designers with a design tool to facilitate and explore Xgoals.
Finally, the literature review indicated a clear bond between Xgoals and the fulfillment of the universal psychological needs, which has not been explored further (see 2.3). Therefore, a secondary objective of this thesis is to initiate a mapping activity to uncover emerging patterns or characteristics.

3

EXPERIENCE GOALS MAPPING

This chapter aims to investigate the existence of any hierarchical levels or categories of Xgoals and uncover their connections with the basic human psychological needs. This is done by utilizing an assembly of Xgoals and psychological needs, followed by a questionnaire and discussions to aid categorization and pattern exposition; and finally, a visual map illustrating the results was created. It is essential to note that the scope of this mapping process is not to reveal all possible links and categories, but rather to initiate a process towards investigating the connections between Xgoals and psychological needs. Additionally, as a secondary aim, this thesis views the exploration of any preexisting categories of Xgoals. By addressing these aims, this thesis aspires to utilize the results as one of the building blocks for the primary aim of this thesis, which is the creation of a design tool.

3.1 METHODS

In the previous chapter, Related Studies, the connection between Xgoals and Psychological Needs (PN) was highlighted and explored (see 2.3). To briefly highlight the main points, Xgoals and PNs can be positioned at the highest level of Hassenzahl's three-level hierarchy of goals (see 2.1 & .3.1), where PNs are viewed as sources of Xgoals (Lu & Roto, 2014) and therefore in terms of hierarchy, PNs rank higher. In addition, the literature review provided essential information serving as a guiding light for the selection of methods and process utilized in this chapter. Firstly, considering the fact that experiences are defined as subjective (Law, Roto, Hassenzahl, Vermeeren, & Kort, 2009), an approach involving participants was chosen to ensure multiple perspectives were included. Secondly, according to Hassenzahl (2010), a shift towards an experience-driven approach is challenging for designers, and therefore the author recognizes the need for more in-depth explanations and a space for reflection during the data collection process.

Positioned in the XFD research, the approaches used were a combination of qualitative and quantitative methods. A quantitative approach was used to initiate the mapping process, familiarize participants with the XFD field, and as a cornerstone for the following structured discussions, leading to the final outcome. The qualitative structured discussions were utilized for uncovering emerging patterns in regard to Xgoals and PNs relationship. Therefore, the process can be divided into two parts, shown in the left (Figure 3–1).

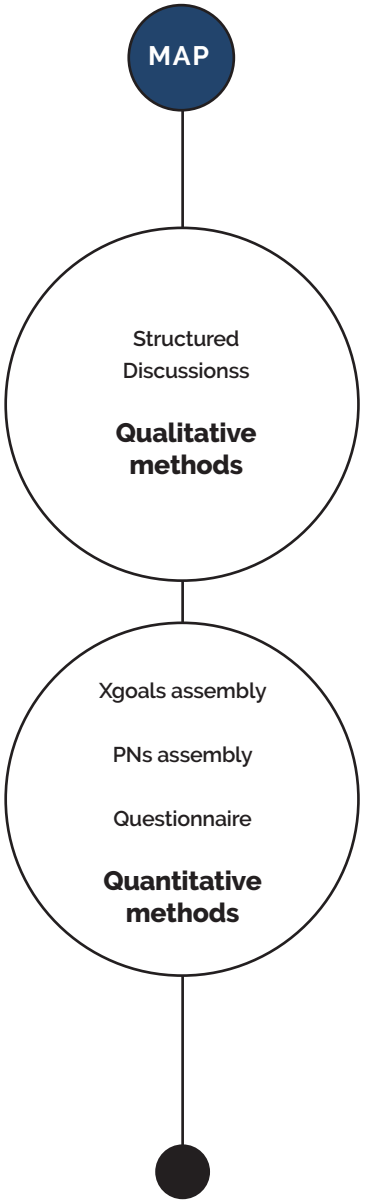

Figure 3-1 Xgoals mapping process

3.1.1 PARTICIPANTS AND ROLES

Reviewing the selected approaches holistically, and given the demanding task at hand, it became noticeable that it would require at least five hours of participants' time and a certain level of perseverance. Additionally, recognizing this Xgoal mapping process as a secondary goal of this thesis, no further considerations for the selection of the participants were defined. Two graduates in mechanical engineering expressed

interest to dedicate their time and efforts to help. Besides being a facilitator, during the process, the author also took the role of a participant.

3.1.2 ASSEMBLY OF EXPERIENCE GOALS & PSYCHOLOGICAL NEEDS

To initiate the mapping process, a list of PNs and Xgoals were selected. For PNs, this thesis uses the original ten as defined by Sheldon (2001) and shown below (Table 3–1), along with their meanings. It is worth mentioning that according to Hassenzahl (2013), a compact list of six PNs are seen as sources of positive experiences directed towards the ultimate goal of happiness and suggests that needs can aid in experience categorization. However, the context of his research was limited to Interaction Design, thereby given the broader perspective of this thesis, all ten PNs were considered.

Autonomy feeling like you are the cause of your own actions rather than feeling that external forces or pressure are the cause of your action.	**Influence** feeling that you are liked, respected, and have influence over others rather than feeling like a person whose advice or opinion nobody is interested in.	**Self-esteem** feeling that you are a worthy person who is as good as anyone else rather than feeling like a "loser".	**Competence** feeling that you are very capable and effective in your actions rather than feeling incompetent or ineffective.	**Money** feeling that you have plenty of money to buy most of what you want rather than feeling like a poor person who has no nice possessions.
Physical feeling that your body is healthy and well-taken care of rather than feeling out of shape and unhealthy.	**Pleasure** feeling that you get plenty of enjoyment and pleasure rather than feeling bored and understimulated by life.	**Relatedness** feeling that you have regular intimate contact with people who care about you rather than feeling lonely and uncared of.	**Security** feeling safe and in control of your life rather than feeling uncertain and threatened by your circumstances.	**Self-factualizing** feeling that you are developing your best potentials and making life meaningful rather than feeling stagnant and that life does not have much meaning.

Table 3–1 The ten basic psychological needs

(Sheldon, Kasser, Elliot, & Kim, 2001)

In addition to the aforementioned, a list of 51 Xgoals were borrowed from the Experience-Driven Design course at Aalto University (Virpi Roto& Yichen Lu), which were compiled from various research publications, such as the Design for Happiness Deck. During a review of the pre-selected Xgoals, it became apparent that the list also contains PNs, therefore they were removed since their inclusion would not provide any additional data. For instance, Relatedness was repeated in both lists, thus it was eliminated. In the end, the remaining assembly consisted of 39 Xgoals. Their categorization was based on Roto's (2011) three timespans of user experience, which according to Lu& Roto (2015), map to the three aspects of the Positive Design Framework (see 2.1.3.2). This thesis follows the same approach of categorization and identifies the following categories: pleasure in the **momentary experience**, personal significance in **episodic experiences**, and finally virtue in the **cumulative experience**. The Xgoals along with their definitions and categorization can be found in the Appendices section of this thesis (Appendix 1).

3.1.3 QUESTIONNAIRE

The collected 39 Xgoals and 10 PNs were employed in an online questionnaire, consisting of 39 multiple-choice questions. Each question included an Xgoal, and a set of ten PNs as choices. The task for the participants, was to select a PN, which in their opinion fits best the presented Xgoal in the question. For instance,
Respect, meaning to experience a tendency to regard someone as worthy, good, or valuable
Where does it belong in the following psychological needs?
Possible answers (Autonomy, Competence, Self-actualizing, Relatedness, Pleasure, Luxury, Self-esteem, Security, Influence, Physical, Does not fit)
(Full list with all the questions can be seen in the Appendix 2)

Participants were asked to follow the definitions provided in every question and to keep in mind that one Xgoal could be associated to several PNs or none at all.
The aims of this questionnaire were two. First, to familiarize participants with the context, terms, and descriptions by

providing some brief information about Xgoals and PNs; and second, to initiate mapping Xgoals to PNs to observe the extent of agreeableness. The latter accumulated an objective overview, utilized as a baseline for further discussions.

3.1.4 STRUCTURED DISCUSSIONS

Since the results from the questionnaire were inconclusive and an in-depth understanding of the relationship between Xgoals and PNs was needed, a follow-up structured discussion with the participants was organized. In this thesis, a structured discussion is defined as a group activity which follows a preset agenda where data collection, analysis, and results are the outcomes of the achieved consensus. In the case of this thesis, two separate structured discussions took place, for which the goal was to uncover emerging patterns of Xgoals and PNs. The previously formulated questions for the questionnaire (see 3.1.2.2) were acting as the agenda for both discussions.

For each question, participants were given time to share their opinions. In the end if consensus was not reached, participants were asked to engage in a constructive debate until agreement was reached. It was agreed during the discussion, that all participants would agree on at least one PN as the outcome of a successfully realized Xgoal. Additionally, these discussions were viewing Xgoals as the result of a design project; which asks the question: If an Xgoal is truly accomplished in a design project, which PN could be fulfilled as a result?

3.2 RESULTS

3.2.1 QUESTIONNAIRE & STRUCTURED DISCUSSIONS

The results from the questionnaire showed that all participants agreed on at least one PN for 13 of the Xgoals. As for the rest of the Xgoals, their match to PNs was inconclusive and answers were scattered without exhibiting any patterns. Therefore, the need for further in-depth categorization became necessary.

In regard to the structured discussions, noticeable patterns and findings started to emerge during the discussion. Relevant for this thesis, proved to be the common realization that Xgoals' relationship with PNs can be divided in three different types. Firstly, to successfully induce a certain Xgoal, there is a preconditional PN to be fulfilled. For instance, to design for evoking relaxation a certain level of established security might be needed. Or in other words, if a design context is interior design of a spa space, where the designer is aiming to evoke the feeling of relaxation for the visitors, she/he would need to ensure the environment is providing a sense of security in order to enable them to feel relaxed.
Secondly, in the same example, the primary Xgoal of this spa space targeted by the designer might be a sense of fellowship, so the goal would be to co-experience spa with friends and family. Therefore, that would directly lead towards the fulfillment of the PN Relatedness.
Thirdly, after the successful realization of an Xgoal and the targeted PN, which are set at the beginning of the design process, a third or more PNs might be fulfilled over time through reflection or with the help of external factors and feedback. Or in other words, if users' need for relatedness through a co-experience has been fulfilled, sharing the experience with others and reflecting on it might lead towards boosting one's self-esteem.
Therefore, three divisions of PNs were introduced as **Preconditional**, **Direct**, and **Domino effect**. The preconditional refers to prerequisite PN fulfillment, the direct addresses the primary target set from the designer, and domino effect relates to the non-intentional need fulfillment occurring after time.

For clarity purposes, throughout this thesis Xgoals will be referred to as having categories, while PN having divisions. Moreover, by categorizing experiences, this thesis follows Hassenzahl's (2010) notion that it"…should not be understood as a reduction…" but instead "as a vessels yet to be filled".

3.2.2 EXPERIENCE GOALS MAP

The results from the discussions were compiled in a visual map illustrating all the revealed connections between Xgoal and PN was created (Figure 3–2).

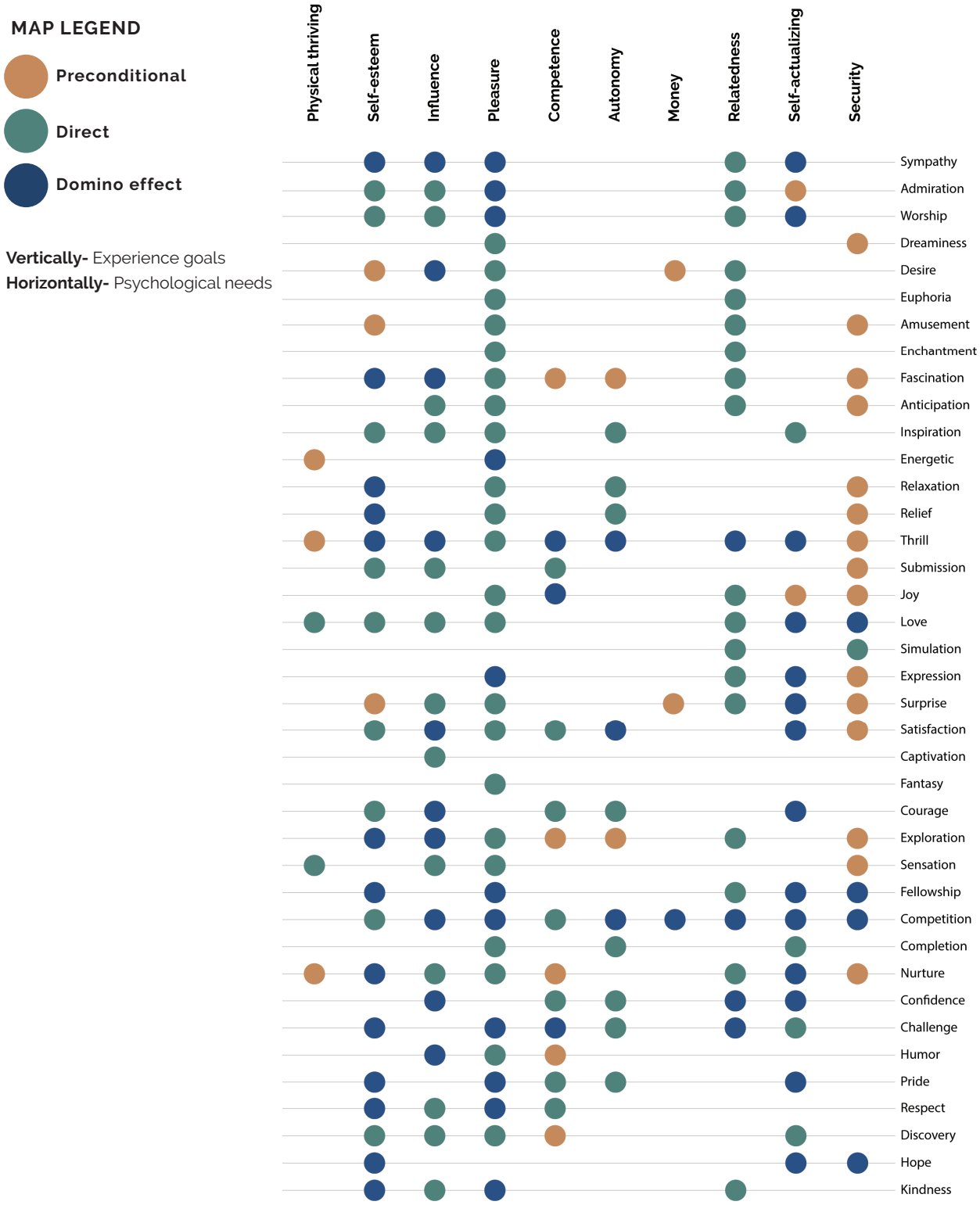

Figure 3-2- Xgoals& PNs map

Complimentary to the map, a summary of the results is shown in Table 3–2, where it can noticeably be seen, that security is leading when it comes to preconditional PNs, followed by competence and self-esteem. In the division of direct PNs, pleasure and relatedness were the ones most frequently selected by the participants. And for the third division, self-actualization and self-esteem lead the domino effect PNs. In contrast, in all three divisions of PNs, money and physical thriving were the least selected.

A study by Hassenzahl(2010) explored PNs as the primary source of positive experiences by collecting over 500 positive experiences in the context of interactive technologies and provided similar high rated results as the aforementioned pleasure and relatedness. Despite the difference in context, this thesis supports Hassenzahl's results in terms of prominence of the first two PNs(pleasure and relatedness). Moreover, in a qualitative UX research (Partala & Kallinen, 2012) with partial aim to unveil the structure of the most satisfying experiences in terms of psychological needs, showed that autonomy and competence exhibit the highest saliency.

The emerged divisions of PNs resemble the three timespans of user experience (momentary, episodic, and cumulative) (Roto;Law;Vermeeren;& Hoonhout, 2011) since they are both time dependent. However, the timespans of experiences are referring to the experience of usage of an artifact, while the PNs divisions look at need fulfillment.

PN	Overall	n, Xgoals	Least	n, Xgoals
Precondition	Security Competence Self-esteem	17 6 4	Money Physical	2 3
Direct	Pleasure Relatedness Influence	23 18 13	Money Physical	0 0
Domino effect	Self-actualizing Self-esteem Influence	16 14 11	Money Physical	1

Table 3–2 Summary of the results from the Xgoals mapping process

3.3 CONCLUSION

This chapter provided explanations regarding to the methods and processes used for uncovering the connections between Xgoals and PNs, leading to the presented final outcomes, namely the Xgoal map and the result summery. Three divisions of PNs were introduced as **Preconditional**, **Direct**, and **Domino effect**. They were revealed with the help of a questionnaire and follow up discussions. Despite accomplishing the goal of mapping the Xgoals to PN and producing fruitful findings, this study has to be seen in light of some limitations. As highlighted by Lu & Roto (2015), the three positive design aspects (pleasure, personal significance, and virtue), used for the categorization of the Xgoals, are by no means exclusive. Some of the Xgoals could be placed under all three aspects, therefore the Xgoal categorization is not clear-cut. Future related studies could focus on further investigating the three identified divisions of PNs and contextualize them since they don't have the possibility to reveal how to approach the fulfillment of PNs though Xgoals.

4 EXPERIENCE DESIGN TOOL- AIMX

This chapter reveals the primary outcome of this thesis- the conceptual experience design tool for defining and ideating Xgoals. It contains the utilized methods and defined design criteria behind the creation of AimX. At the end a set of instructions for utilizing the design tool are outlined.

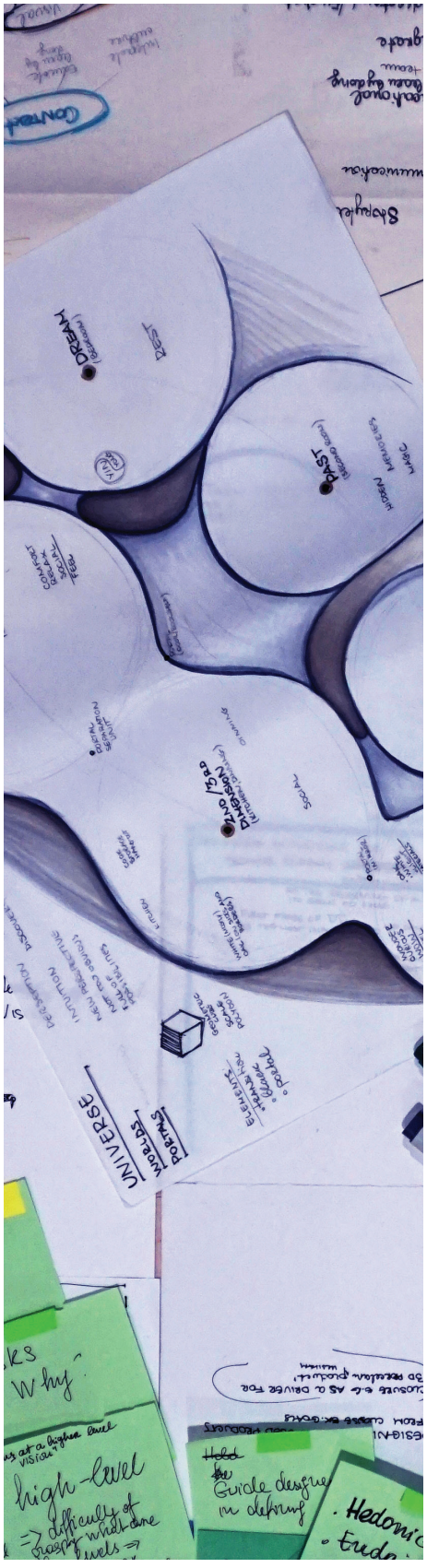

Figure 4-2a- Photo from the author's process

4.1 AIMS

Nowadays, the design process has been defined as value-driven and designers have the role of "**enablers of meaning**" (Press & Cooper, 2016). In line with this, XFD first directs designers' attention to the meaning of an experience and its impacts, which connects it to value creation through experiences (Lu, 2018). As previously highlighted, experiences are viewed as the only evidence one has of existence (Csikszentmihalyi, 2014) and hold the key towards one's happiness. Thus, designers' role in this ever-changing world, holds a great responsibility to design for experiences and has the power to make a significant difference in one's life through design. However, this ambiguous task presents difficulties for designers, since it requires a shift from the traditional problem-solution mindset towards experience-driven one. A large proportion of the challenges are related to designers' native tendencies to focus on the tangible side which is usually the product (Hassenzahl, 2010). In XFD, experience comes first and designers initiate the process by defining Xgoals, which act as the driver for the creative design process. Despite having Xgoals as a design tool of XFD, the Xgoal definition process is defined as "**iterative, fuzzy, and complex**" (Varsaluoma;Kaasinen;& Lu, 2015) and according to Roto et al. (2017), it creates a lot of obstacles for designers. Therefore, it results in poorly defined Xgoals, which are unable to lead the design process towards a successful realization of the Xgoals (Kaasinen, et al., 2015).

This thesis recognizes the mentioned gap and aims to create a design tool that facilitates the Xgoals definition process and support Xgoal ideation. Therefore, two main aims for the creation of the design tool are outlined: 1) **to help designers in their XFD journey towards Xgoal definition**; 2) **to aid the ideation of Xgoals**. By accomplishing the aims, the author aspires to empower designers to utilize the XFD methods and design for experiences.

4.2 METHODS

4.2.1 PROCESS

For the creation of the conceptual design tool, the author used the Double Diamond structure (Design Council, 2017) as a creative design process (Figure 4-1). The Double Diamond provides a visual framework for designers and the structure represents mainly two processes: divergent and convergent thinking. This thesis adopts the framework and its four phases: discover, define, ideate and implement.

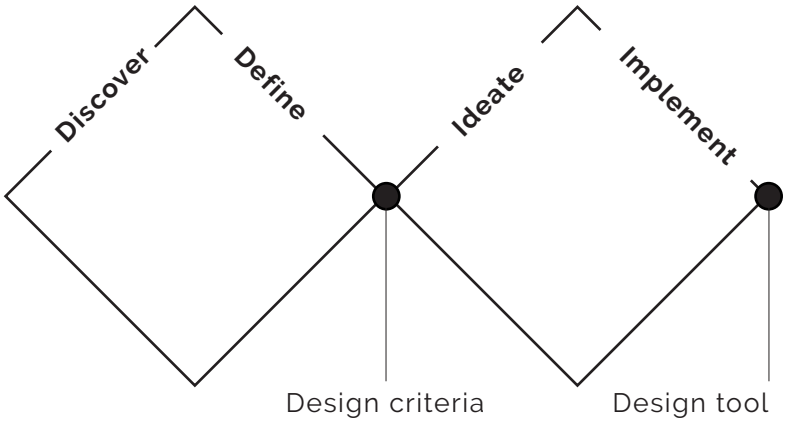

Figure 4-1 Double diamond structure (Design Council, 2017)

Discover> Define> Ideate> Implement

For the first phase of this process (discover), the author explored the XFD field by reviewing literature on this topic (see Chapter 2); grasping the origin of the field, basic principles, ideology, and focusing on compiling data about Xgoals from various sources. The two established aims for the creation of the design tool were used to filter the information relevant to this thesis. After this familiarization process, the author engaged in a mapping process to explore the Xgoal connection with PN (see Chapter 3). All findings were inserted into an analog mind map (Figure 4-2 a&b) to enable holistic review of the collected data. The define phase was then completed with the compiled data which was categorized and a set of

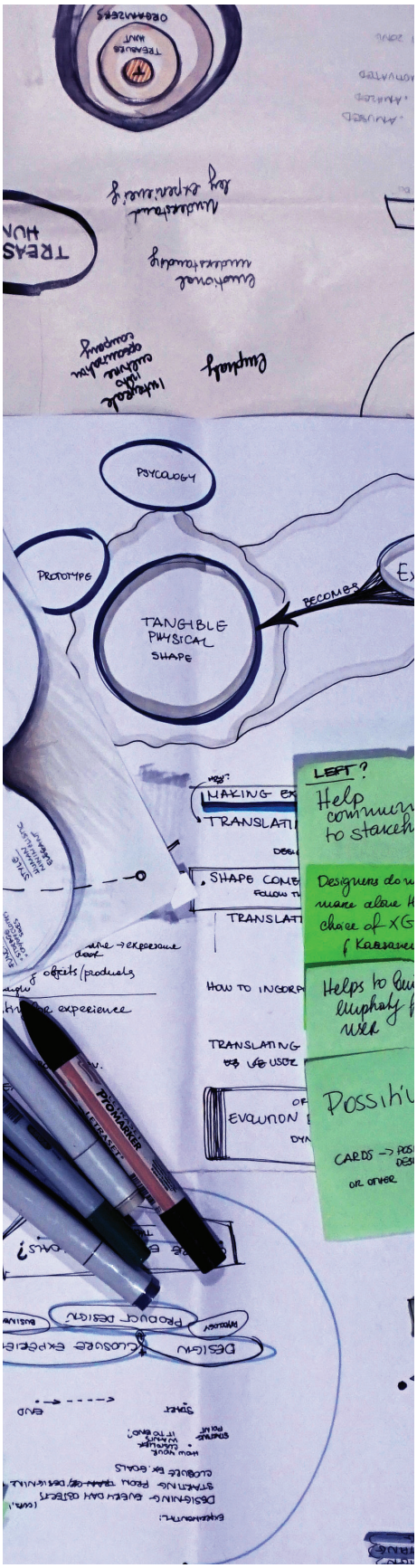

Figure 4-2b- Photo from the author's process

design criteria emerged (see 4.3).
Sketching was the primary method used for the ideation phase of the process, from which several concepts surfaced. However, one presented to be most suitable for the set design criteria. The selected concept was then polished through a series of illustrative examples. The outcome of this second diamond is the presented conceptual tool (see 4.4).

4.2.2 AUTHORS' ROLE AND EXPERIENCE

For this chapter of the thesis, the author's leading role was a designer. It is essential to note that the author of this thesis has a previous experience utilizing the Xgoal-driven design process. As a part of Aalto University curriculum, the author participated in Experience-driven design course 2018 (Course code: MUO- E3006), where team of 3 designers tackled a brief presented from a Finnish industrial company. The challenge was to increase situational awareness in lifecycle services by creating a platform for company employees. In a timeframe of 7 weeks, Xgoals were defined and finalized in a collaborative manner. Moreover, in the end of the course, the design team had to present a concept with an initial digital prototype and formalize a report. This course brought a lot of valuable insights and inspiration for further development of the author's design mindset, which have affected all following design projects.

4.3 DESIGN CRITERIA

The design criteria were shaped as a result of the key aspects from the related studies and the Xgoal mapping process and the insights derived from the personal experiences of the author. Accounting for the previously underlined difficulties for designers related to the XFD field, the author recognizes the need for unity and simplicity as a design vision, guiding the creative process for the creation of the tool. For designers to comprehend the process of Xgoals definition, the tool should provide unified visual guidance with clear steps and direction. From one point of view, in order for the design tool to communicate the Xgoal concept accurately, prioritized design

criteria must be supported, since they were identified as the essential characteristics of Xgoals. Hopefully, this would lead towards well-defined Xgoals and a common understanding of the definition process.
From the other perspective, the author has highlighted criteria related to the "surroundings" Xgoals and their relationship with their source, the PNs. It is the author's assumption that by revealing the known experiential aspects of Xgoals, the likelihood for designers to grasp the XFD field would increase. The experience design tool should:

Provide visual guidance for the Xgoals definition process

An aim of the Xgoals, as a tool of XFD, is to ease the switch from the problem-solution way of thinking towards one that places experiences at the core (Lu, 2018). Additionally, accounting for the difficulties that designers face in utilizing the XFD approach, the author emphasizes on the importance for the tool to bring visual clarity and offer guidance.

Place Xgoals at the core

Xgoals direct and act as a driver for the creative design process (Lu & Roto, 2015). They are defined during the initial phases of a project to ensure that experiential aspects are at the center of the design process. Thus, Xgoals should be at the core of the tool.

Address the timespan and properties of Xgoals

Xgoals hold both hedonic and eudaimonic characteristics (Mekler & Hornbæk, 2016), therefore the design tool should find a way to convey them. Moreover, as previously outlined, this thesis utilizes three categories of Xgoals: **pleasure in the momentary experience, personal significance in episodic experiences, and finally, virtue in the cumulative experience**.

Reveal Xgoals position

In the related studies chapter, it was exposed that Xgoals and PNs are both located in the "**why**" level of Hassenzahl three-level goal model, where PNs are sources of Xgoals (Hassenzahl,

2010) (Lu, 2018) (Lu & Roto, 2015). It is the author's opinion that by visually revealing the position of Xgoals in regard to PNs, designers would have the chance to gain a more holistic view of the XFD process.

Enable Xgoals exploration

To account for the fact that Xgoals expand the design space (Lu & Roto, 2015), co-exist with other design goals, and are iterated during the whole design process (Lu, 2018), the author recognizes the need for an exploration space to be incorporated into the tool.

Suitable for various iterative processes

Companies, as well as designers, have different processes that they utilize to complete a project. In addition, some projects are tackled with collective efforts and others by individual designers (Varsaluoma;Kaasinen;& Lu, 2015). This thesis takes a broad perspective and aims to create a tool suitable for various types of processes.

Offer a format for defining Xgoals

It was noticed during the literature review that Xgoals lack clear format for definition. For example, "WoW" and "trust in automation" (Roto, et al., Utilizing Experience Goals in Design of Industrial Systems, 2017) present different levels of concreteness. Therefore, the tool could offer a formulation of Xgoals, to some degree, in order to close the gap between the level of concreteness.

4.4 EXPERIENCE DESIGN TOOL- AIMX

This thesis introduces, as the main outcome, the conceptual experience design tool **AimX** (Figure 4-3). As visual representation, the tool has adopted the self-explanatory and widely used illustration of a target with the hopes to bring visual clarity and unity. Aim for Experience (AimX) is the original name of the tool and besides a name it also conveys a message for designers (See the full message on the back cover), urging them to choose to design for experience: **Aim for Experience!**

The experience design tool offers visual guidance through a target illustration, which designers can follow towards defining Xgoals. It contains four concentric circles representing the various aspects of defining Xgoals, where the core is the main aim and outcome of the process: Xgoals. In order to reach the center, designers will need to first address the outer circles of the design tool, since experiences "**get their value through the psychological needs they fulfil**" (Hassenzahl, 2010). The arrow in the AimX illustration, which spans from the outside in (towards the core), indicates the direction of the definition process.

To address the timespans of experiences, the pre-set categories of Xgoals are incorporated into the tool's structure. Thereby, the inclusion of the hedonic and eudaimonic characteristics will be ensured to some degree in the final set of Xgoals. The circles and their meanings are explained below, starting from the outer-most circle:

Cumulative/ Psychological needs

The outer circle is where PNs are located, accounting for the fact that they are the sources of Xgoals and give experiences their value (Hassenzahl, 2010). Moreover, as previously emphasized, fulfilling the PNs leads to the ambiguous aim of positive design: design for happiness. This circle's aim is to focus on the cumulative experiences towards human flourishing and well-being, or in other words, it is where eudaimonic characteristics of Xgoals will be situated.

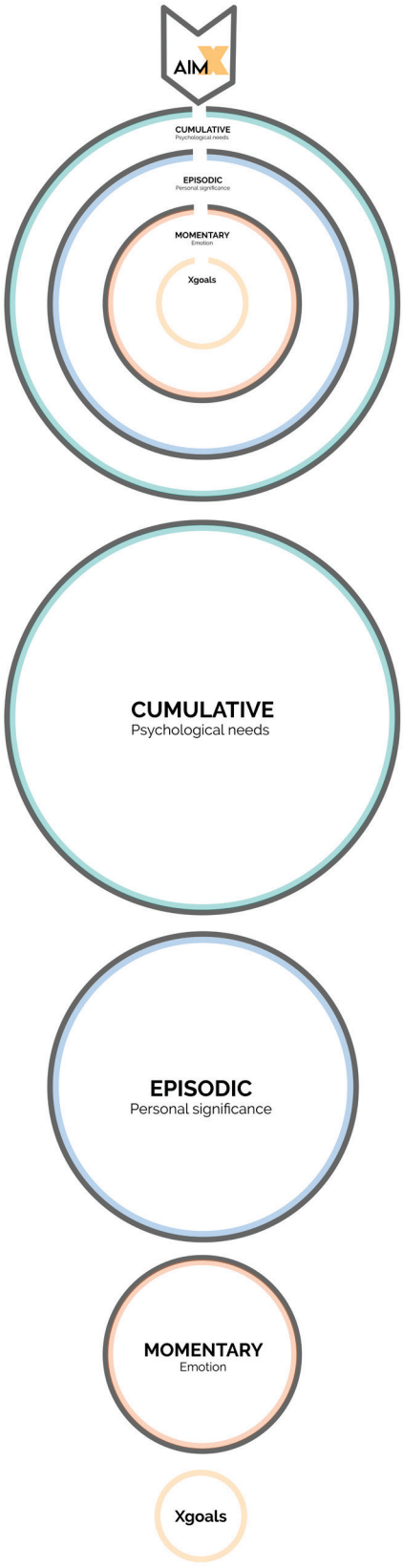

Figure 4-3- AimX experience design tool and its components

Episodic / Personal significance
This circle space is intended for setting short or long-term goals related to individuals' goals and aspirations (Desmet P. M., 2013). Experiences with personal significance at the core. Alternatively, this circle can also present experiential aspects, which are viewed as the result of a series of momentary emotions.

Momentary / Emotion
This circle is where the hedonic properties of Xgoals are defined and the intended emotional engagement is targeted by the designers. The aim is to think in terms of momentary positive emotion, which the design project will seek to evoke.

Xgoal definition / The core

Finally, the inner circle is where Xgoal definition takes place. It is where the goals become an "articulated design aim" (Lu, 2018). After exploring the outer circles, designers can start the "connect the dots" game with the aim to link the defined cumulative, episodic, and momentary experiential aspects together. This process is addressed as Xgoals ideation throughout this thesis. Formulating various combinations is recommended and utilizing insights from the design context helps to prioritize Xgoals. This circle is complete when the designer has selected a set of Xgoals.

In addition to the visual guidance provided by the tool, this thesis proposes a format for defining Xgoals. The format follows the structure: Emotion for PN (or Episodic). By using prepositions (e.g., through, for, towards) as combination words between the explored Xgoals, they are turned into a more concrete goal. Moreover, it is possible to add the context into the phrase as well to elaborate further.
An example can be surprise for security, where the selected emotion provides the hedonic properties and the PN the eudaimonic. To clarify it further, the newly formed Xgoal should be put in context: security through surprise for a novice ice skater.

The design tool can be used in analogue or digital format, which makes it suitable for various individual or collaborative

design processes. It is scalable to different paper sizes, therefore in case the project is a collective effort of a team, a larger size with additional exploration space is available.

4.4.1 INSTRUCTIONS FOR USE

Along with the experience design tool, a set of instructions for use was created to ensure the Xgoals definition process is communicated properly. It is necessary to highlight that to start the definition process of Xgoals, setting the context is a precondition (e.g., design brief, problem statement). AimX can be utilized before, after, or in parallel with the design project's investigative activities. The detailed instructions can be found in the Appendix 4.

4.5 CONCLUSION

This chapter presented the main outcome of this thesis, namely the AimX experience design tool created to aid designers in the Xgoals definition process. The visual representation of the tool has adopted the illustration of a target and contains four circles representing four experiential aspects. It helps designers to start their journey to design for experiences by providing visual guidance accompanied by a set of instructions to ease the use of the tool. AimX reveals an experiential hierarchy, with the aspiration to support the holistic overview of the Xgoals definition process. In addition to the design tool, this thesis proposes a way to formulate Xgoals since such a format was lacking. In the next chapter the design tool will be evaluated according to the design criteria and insights about its utilization by designers will be uncovered.

5 EXPERIENCE DESIGN TOOL EVALUATION

This chapter focuses on the evaluation of the conceptual design tool AimX, presented in Chapter 4. First, it directs the attention towards the aims and methods applied for the evaluation, along with the data collection and analysis approaches. Second, it discloses the results from the evaluation process in four categories, followed by the conclusion of this chapter.

5.1 AIMS

Since the design tool's main purpose is to address the Xgoal definition and ideation process by offering visual guidance, it is fundamental to lead its evaluation in the same direction. As the first evaluation of the newly created design tool with designers, the author seeks to gain an in-depth understanding of the tool's utilization in practice. Placing AimX in designers' hands can clarify if the Xgoal definition process is understandable, whether the design criteria of AimX were accomplished through the visual representation, and if the design tool provides value for designers.

It is worth mentioning, that originally the evaluation of AimX was arranged to take place in Torino (Italy) with the participation of around 60 bachelor students as part of an annual workshop called Inventor Bootcamp organized by School of Entrepreneurship and Innovation (SEI). However, due to the COVID-19 pandemic, the workshop was canceled. This sudden change affected the thesis schedule and timeline in addition to the already prepared evaluation materials. Fortunately, with a quick mobilization, alternations of the aims, and participation of curious designers willing to help, a new plan was set in motion.
Therefore, a set of aims for evaluation of AimX were defined and prioritized as follows:

Primary:

• To reveal the practicalities around utilizing the AimX's process and its understanding,

Secondary:

• To assess if AimX can aid exploration of Xgoals,
• To uncover whether or not the AimX tool holds any value for designers,
• To determine if the visual representation of the tool truly delivers its purpose.

On the other hand, this thesis acknowledges the fact that it would be essential to compare the AimX definition process

to other existing frameworks or models in order to discover whether or not the tool helps designers to switch to experience-driven thinking. However, this type of evaluation would require a study which is not feasible within the timeline of this thesis. Additionally, the evaluation of the quality of Xgoals articulated though the AimX utilization is out of the scope.

5.2 METHODS

The abovementioned aims, directed the approaches for this evaluation process towards an exploratory path. This thesis sought to ensure the validity of the collected data and followed a triangulation approach. Therefore, data was collected through observations, thematic interviews, and feedback forms. For the interviews and observations note-taking was the primary way of gathering the data. Analysis of all the compiled data was done with the help of the Conventional Content Analysis method (Hsieh & Shannon, 2005). Where, first, key concepts are highlighted and the researcher "**…approaches the text by making notes of his or her first impressions, thoughts, and initial analysis. As this process continues, labels for codes emerge that are reflective of more than one key thought. These often come directly from the text and are then become the initial coding scheme. Codes then are sorted into categories based on how different codes are related and linked**."

The selected methods were then used in two separate workshops, where designers engaged in group and individual tasks. One of the mentioned workshops was conducted online and the other in person, where overall eight designers participated. Both workshop sessions followed the same structure, which will be explained in detail in the next sub-chapter section (see 5.2.2).
The feedback form consisted of twenty questions, shaped with the help of the set design criteria for the creation of AimX and the set aims for this evaluation process. Questions were mainly oriented towards the AimX Xgoal definition process, usability, improvements, and implementation of AimX. Seven of the twenty questions were open ended, while the rest were Likert-type scale questions. Examples of both type questions can be seen in Figure 5-1, whereas the full feedback form can be found in Appendix 6.

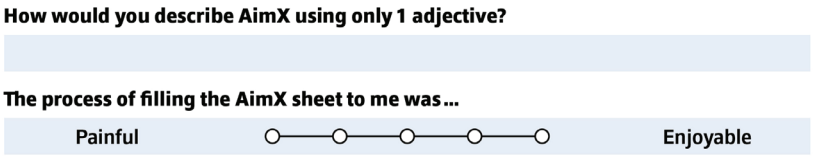

Figure 5 1- Example questions derived from the feedback form

Similarly, to the questions from the feedback form, the observations and interviews were following the same themes. However, through the observations the author sought to further focus the attention on team dynamics during the group task and oversee the time period sufficiency for all tasks. Whereas during the thematic interviews, focus was placed on the practical obstacles related to the utilization of AimX. The thematic interviews took place during the workshop (see 5.2.2), specifically while the individual task was on-going. Participants were asked to explain the difficulties in regard to using the AimX design tool and elaborate further why in their opinion it is an obstacle.

5.2.1 PARTICIPANTS AND ROLES

The experience design tool AimX is aimed for designers, regardless of the specific design field, therefore there weren't any additional preconditions for the selection of participants. The eight designers who participated in this evaluation process of AimX were design graduates and students from industrial design, interior design, and service design. Their age varied between 24-34 years old, where three of them were male and five were female. Moreover, two of the designers have had a prior experience with Xgoal-driven design process since they participated in the Experience-driven design course in Aalto University.

From the beginning of this evaluation process the author presented a consent form (Appendix 5), which outlines the scope of this workshop and participants involvement. All participants agreed to the listed terms and signed the consent form.

During both workshops, the author of this thesis acted as a

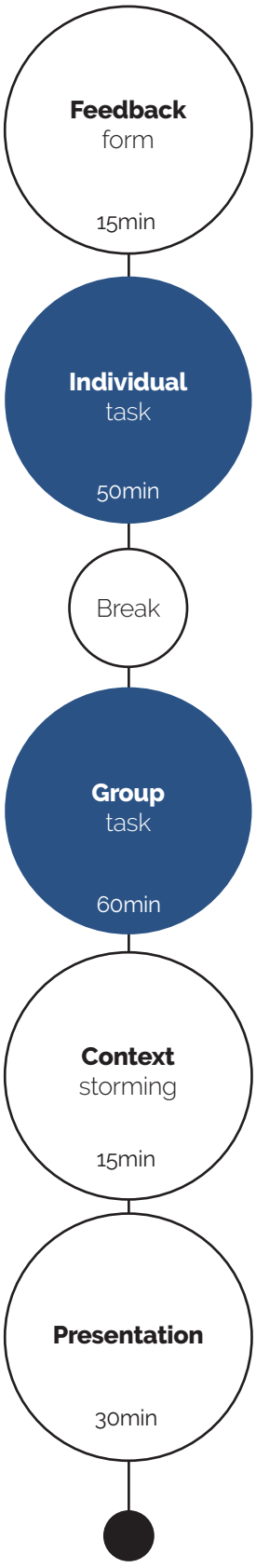

Figure 5-2 AimX evaluation process

facilitator. Overseeing the process and providing additional explanations where needed to ensure the Xgoal definition process is understood as originally intended.

5.2.2 EVALUATION PROCESS

"**Repetition is the mother of learning, the father of action, which makes it the architect of accomplishment.**"
Zig Ziglar

This phrase illustrates a widely known understanding that repetition improves learning, which has been a topic of numerous studies. The first person to prove this fact empirically was the German psychologist Hermann Ebbinghaus (Greene, 2020). This was the inspiration behind the creation of the structure (Figure 5-2) for this evaluation process, where the idea is to offer a chance to designers to apply the Xgoals definition process twice.

Therefore, the process (see Figure 5-2) was divided into two parts: a group and an individual task. Prior to engaging the designers with the tasks, the author provided brief theoretical background of the XFD field and AimX process. Followed by a short "context storming" activity, which provided the context for the group and individual tasks. In the group task, the designers had to decide on a context they wish to address, follow the AimX instructions to fill the sheet, finalize Xgoals set and engage in a quick ideation session. Similarly, the individual task followed the same structure with the difference that participants had to individually follow the AimX process. To complete the tasks, each designer was given the AimX design tool sheet accompanied with the assembly of Xgoals and PN derived from Chapter 3. The participants were encouraged to use the Xgoals assembly as an inspirational guide during the process and set their own goals. After both tasks were finished, the participants were given 15 min to fill the feedback form. The details about each step of the process are explained below.

Presentation

At the beginning, the author held an introductory presentation, which had three main objectives: 1) to familiarize the designers with the XFD fields and Xgoals; 2) to introduce the AimX design tool and provide participants with examples for its use; 3) to reveal the time schedule and tasks.

Context

Often in Design Thinking, problem definition (Wolniak, 2017) or formalizing a problems statement (Dam & Teo, 2019) are regarded as the initial phases in which context is provided for design activities. However, as previously highlighted (see 2.1.2), XFD strives to escape this problem-solution mindset and diverges away towards an experience driven way of thinking. Therefore, to support this change, the author selected to use the words "context storming" to refer to the activity of ideating for possible topics.
In this phase, participants were tasked to individually ideate topics they would like to address through design and hobbies they fancied. A criteria for the aforementioned, was that it should have a narrow scope; therefore, topics like pollution or climate change were not found suitable. The reason behind including a brief context storming exercise was to ensure, to some degree, the engagement of designers in the process of defining Xgoals.

Group task& Individual task

To initiate each of the tasks, the participants had to select a topic from the previous activity. After which, they could start the exploration of the AimX design tool, by following the instructions given by the author (see Appendix). Participants were asked to finalize a Xgoals set at the end and engage in a quick ideation session, in which they would think about possible manifestations of the selected Xgoals. The purpose of this short ideation session was to show to the participants next steps for utilizing the Xgoals and give them an idea how they can use them. However, the outcomes of it will not be included as a part of this evaluation procedure.
Similarly, the individual task followed the same structure,

Photograph form the workshop, taken by the author

Photograph form the workshop, taken by the author

where designers were using their own hobbies as context. During both tasks, the author of this thesis was observing the activities, collecting data, and facilitating the process. The thematic interviews, however, were mostly conducted during the individual task.

5.3 RESULTS

Prior to presenting the final results of both workshops, the author would like to direct the attention towards the results derived from the tasks tackled by the designers. Firstly, during the context storming session the participants were able to outline approximately 30 possible contexts (e.g., immobility of possessions, creating positive attitude towards bio waste, …), from which they chose one for the group task. For example the group form the workshop organized in person, tackled improving the queue line experience in Finnish student food canteens needed to be addressed since currently que lines are quite long and students are unprepared to pay for their meals causing a slow movement of the line. After embracing the AimX's process the team of designers finalized the Xgoals as follows:

- Relaxation for positive self-evaluation and self-esteem,
- Anticipation for confidence and security,
- Satisfaction for joy and autonomy.

Secondly, for the individual task, the designers selected topics such as tackling the fear of ice skating for novice skaters and cooking as an explorative activity. One of the designers, selected to tackle "designing for meaningful & useful objects for post-corona world, in which survivalist outlook on everyday activities has become relevant". As a final Xgoal, the designer decided to aim for:
"creating a sense of security through self-determination and hope".

The data collected from the thematic interviews, observations, and feedback forms were analyzed using the Conventional Content Analysis method, from where four main clusters

emerged. The feedback form's questions, which utilized the Likert scale rating (1 to 5, where 5 is positive) are now presented and their average sum is displayed on the tables.

The Overall cluster (Table 5-1) shows a general perspective on AimX. It highlights the impressions, the designers were left with at the end of the workshops. For example, designers described AimX as "**aspiring**" and "**intriguing**". The second cluster is named Process (Table 5-2) since it presents the results related to the understandability of the process and outlines the obstacles the participants have encountered during the process. The rating, concerning the **process**, were averaged to **3.7** out of **5**. Table 5-3 displays the finding associated with the visual representation of AimX, where the participants rated the design tool as explorative (**4.5**/5). Additionally, from the thematic interviews, three of the designers pointed out that AimX has a direction of viewing and direction of filling, which created some confusion in their opinion. The last cluster, namely Experience (Table 5-4), emphasizes on participant's emotions during and after the AimX process. This cluster exhibits that participants found the process as **enjoyable** (**4.4**/5) and feel **empowered** (**4.5**/5) after the workshop. The grand score of this final chapter received an average score of 4, whereas the visual cluster rates 4.3 out of 5.

AimX **Overall**	
Feedback form	Designers described the tool as: "**interesting**", "**explorative**", "**conceptual**", "**aspiring**" "It applies to my **value-driven creative process** to approach the practical level" "I like the it **escapes the normal thinking** which is the problem-solution and it also opens space for exploring"
Observations	During all the activities, the participants seemed engaged, however the provided time schedule for completing the tasks was too short.
Thematic interviews	**Not enough time** Participants expressed opinions related to the lack for the given task, since in their opinion grasping the terms and definitions in order to used will take a longer period of time.

Table 5-1- Results from the evaluation process- Overall cluster

AimX **Process**		
Feedback form	**Simple** **Effortless** Gained understanding **Strongly agree** Difficulties **Practical** "Remembering the definitions and linking goals when they are written directly on the paper." **Connections between levels** "The connection between the levels of hierarchy were difficult to understand at first, but once I did it for a second time it became easier."	**3.5** **3.5** **4** Likert scale 1 to 5 **Score 3.7**
Observations	**Fuzzy start** The start was fuzzy and additional questions, mostly regarding the different levels of AimX, were posed. **Agitation** The fact that the participants had to navigate between AimX sheet and the Xgoal assembly sheet created some agitation. **High-level** The conversations during the group task remained related only to experiential aspects.	
Thematic interviews	**Forgetting** Challenging to remember the definitions (PN and Xgoals) and the terms from the AimX sheet. **Instructions** Lacking more elaborate instructions in regards to the connections between the circles.	

Table 5-2- Results from the evaluation process- Process cluster

AimX **Visual**		
Feedback form	Target illustration-supports the process **Strongly agree** Exploration space **Explorative**	**4** **4.5** Likert scale 1 to 5 **Score 4.3**
Observations	**Quick** It came to the author's attention that participants quickly and effortlessly understood and utilized the illustration of AimX.	
Thematic interviews	**Direction of viewing& direction of filling** Some participants expressed a concern that two aspects of the target illustration are evident: direction of viewing and direction of filling the sheet	

Table 5-3- Results from the evaluation process- Visual cluster

AimX **Experience**		
Feedback form	First impression **Neutral** Feeling during **Enjoyable** Feeling after **Very confident** **Empowered** **Confidence** Will use it again **Strongly agree**	**3** **4.4** **4** **4.4** **4** **4.5** Likert scale 1 to 5
		Score 4
Observations	**Bonding experience** While exploring Xgoals together, the designers were also sharing personal stories evoked from the Xgoals.	
Thematic interviews	**Perspective** Three of the participants shared that they found the discussions during the AimX process insightful since they can recognize other`s perspectives. For example, the meaning of sympathy seems to be understood with slight differences according to the individual`s experience.	

Table 5-4- Results from the evaluation process- Experience cluster

5.4 CONCLUSION

This chapter uncovers the details around the evaluation process of AimX and presents the findings in four clusters (Overall, Process, Visual, and Experience). The author of this thesis selected an exploratory direction and triangulation approach to set an evaluation process. Two workshops were conducted with overall eight designers, from which one was organized remotely and the other in person. Thematic interviews, observations, and feedback forms were the data collection methods and their outcomes were analyzed through categorization.

6 DISCUSSION

This chapter discusses the answers of the research questions of this thesis, outlines the limitations and suggests directions for potential future studies.

6.1 Research question 1

How can existing Xgoals be mapped to the ten basic psychological needs?

This thesis **builds on** previous research notion that PNs provide the value for experiences (Hassenzahl, 2010) and are found to be a source of Xgoals (Lu & Roto, 2014). The direct link between PNs and experiences has been studied from the perspective of UX, which suggests that PNs can be employed as a method for categorizing positive experiences that initiates the design process (Hassenzahl, et al., 2013). However, from the perspective of Xgoal-driven design, the connection between PNs and Xgoals have not been investigated further, yet. This thesis aspires to uncover emerging patterns and shed light on their relation.

Firstly, to address this gap, it is imperative to start with gaining a thorough understanding of both Xgoals and PNs. As explored in the related studies chapter (see Chapter 2), they both can be positioned at the "why" level of Hassenzahl's three-level hierarchy of goals (Hassenzahl, 2010), which provides the motivations behind future actions and it is the start of the XFD approach. Moreover, the ten basic PNs are referred as "high-level experience goals" (Lu & Roto, 2014) which have been associated with long-term eudaimonic characteristics (Mekler & Hornbæk, 2016). Whereas, Xgoals have been tied to both eudaimonic and hedonic characteristics (ibid.).

Secondly, with the above-mentioned aspects in mind, the author engaged in a **mapping process** where a pre-selected list of existing Xgoals were mapped to the ten PNs (Chapter 3). Through a questionnaire and a follow up structured discussions with a total of three participants, all the 39 Xgoals were linked to their corresponding PN. To clarify, Xgoals naturally fall under one or many PNs. Throughout this process, noticeable patterns related to the relationship between PNs and Xgoals emerged; however, the three types of connections they share proved to be relevant for this thesis. The three types of links between Xgoals and PNs are referred to as divisions of PN and have been named **Preconditional**, **Direct**, and **Domino effect**.

The first type of connection suggests that a preconditional PN requires to be fulfilled first, in order to induce a certain Xgoal. The results indicate that **security** is a common precondition since it was corresponding to **17** out of the 39 Xgoals. In other words, design projects aiming for evoking relaxation may require to fulfill the PN of security first, in order to successfully reach the aim.
The second type of relationship refers to a direct PN, which will be fulfilled through the selected by the designer Xgoal. For instance, the same Xgoal of relaxation, if successfully evoked through design, would lead to the fulfillment of the PN of pleasure. In fact, **pleasure and relatedness** are the two most popular PNs which were the most selected in this direct division of PNs (**23** of the 39 Xgoals map to pleasure and **18** to relatedness).

Subsequently, the successful realization of an Xgoal can lead towards fulfilling yet another PN through reflection or with the help of external factors and feedback (i.e., relaxation in long-term can lead to boosted self-esteem). For this type of Domino effect relationship, the results show that Xgoals are likely to lead towards the satisfaction of the PNs **self-actualizing and self-esteem** (16 and 14 Xgoals, respectively).
Considering the three divisions of PN (Preconditional, Direct, and Domino effect) in design projects, can lead the designer towards a broader view on Xgoals and their impact in terms of need fulfillment. In addition, by discovering and addressing the preconditional PNs first, designers can be one step closer to the succession of the Xgoal realization. For example, accounting for one's need for security, could realize the momentary intended Xgoal of relaxation. The domino effect PN, when taken into account in the early stages of the design process, can aid designers to gain a broader perspective on the impact that their designs can have on the users. Therefore, mapping Xgoals to PNs can provide the design process with beneficial insights, which hold power to widen the designers' views and, to some extent, support the Xgoals realization.

6.2 Research question 2

What kind of tool can aid designers to define and explore Xgoals?

An essential steppingstone for XFD approach, is deciding the experiences that a design project would aim for by defining Xgoals. According to Roto et al. (2017), the main **difficulty** for designers revolves exactly around Xgoal **definition process** and in the industry, **vague** and **abstract Xgoals** (e.g., "WoW or "good user experience) often lead the process, which are unable to guide the process towards a successful experience design (Kaasinen, et al., 2015). Previous studies have named this initial phase as the "**fuzzy front end**" (Varsaluoma;Kaasinen;& Lu, 2015) and have attempted to address this issue by outlining a four-step instructional guide to aid designers. However, the guide provides only general directions rather than concretized step-by-step guide process and no clear format for Xgoals is included. Therefore, this **thesis' primary aim** is to bridge this gap and develop a design tool which can help designers in defining Xgoals.

In order to address this gap, the author defined a set of design criteria (see 4.3), which are derived from the theoretical background (Chapter 2) and the findings from the Xgoals mapping process (Chapter 3). By and large, the design criteria offers two perspectives- **essential** and **complimentary**. The first one is focused on communicating the **essential characteristic** of Xgoals and correctly conveying their concept, while the second perspective, includes criteria related to the Xgoals' source: PNs. It is the author's assumption that by visually revealing the known experiential aspects of Xgoals and their relations, the likelihood for designers to understand the XFD field would increase. Accounting for the fact that Xgoals are the drivers for the creative design process and are set at the start (Lu & Roto, 2015), a design tool should grant them a **central spot**. Previous research indicates that Xgoals **expand the design space** (Lu & Roto, 2014) and their definition is an **iterative process** (Roto, et al., 2017), therefore the **facilitation of exploration and iteration** should be accommodated by the tool. In terms of characteristics, Xgoals hold both **eudaimonic and hedonic ones** (Lu, 2018), hence they should be communicated

through the design tool to ensure, to some degree, that the final set of Xgoals includes them.

Based on the above-mentioned design criteria, the author developed an experience design tool aimed to aid designers define and explore Xgoals. The novel design tool's name is **AimX** and it consists of four concentric circles, which are representing the experiential aspects of Xgoals. For example, pleasure is located in the **momentary experience**, **personal significance in episodic experiences, and finally, PNs** are situated in the **cumulative experience circle**. AimX offers a step-by-step process for defining Xgoals, where designers are tasked to first explore all the circular spaces before formulating or finalizing the Xgoals. The author also proposes a **format for Xgoals** by using proposition words (e.g., for, though, with, in) to combine the selected goals from each level. For instance, an Xgoal can be relaxation for security through trust. By exploring various combinations, designers can concretize the Xgoals and understand, in-depth, how the experiential aspects are related.

An imperative next step, in this thesis' journey, was to test AimX with designers to assess whether or not the set's design criteria were achieved and to gain an in-depth understanding of its utilization in practice. In order to test the tool, the author organized two separate workshops with total of eight designers. In order to accomplish the aims for this test, the author selected a triangulation approach. The data was collected through feedback forms, thematic interviews, and observation, while the analysis was done with the aid of Conventional Content Analysis method.

Overall, designers described the tool as "**aspiring**", "**intriguing**" and a "**… value-driven process…**", that "…escapes the normal thinking, which is the problem solution…" way. The feedback form's results show that the target illustration, which the tool adopts, supports the process and AimX was found as **explorative** (4.5 out of 5). Through the observations, it was noticed that the conversations, in regards to defining the Xgoals, remained **related only to experiential matters** and no discussions were had about how and what would be the physical manifestation of the Xgoals. This finding supports previous

studies by Roto et al. (2017) that "Xgoals work well in creating and maintaining an experience mindset within the design team". In regard to the process of AimX, the results suggest that participants **enjoyed** filling out the tool's sheet (4.4 out of 5), however during the process, some obstacles became evident. Firstly, during the thematic interviews, the designers pointed out that the connections between the circles are not obvious and require more elaboration. Secondly, since the author provided a set of cards to aid the exploration of Xgoals for the process, practical difficulties of switching between many sources of information occurred. Thirdly, the participants indicated that the terms used in the tool and to explain XFD field, as a whole, were hard to grasp, given the timeframe for the workshops. The highlighted three obstacles, especially the latter, seem to substantiate Hassenzahl's (Hassenzahl, 2010) notion that utilizing XFD approach is associated with multifaceted obstacles for designers.
Despite the struggles, the results suggest, that the designers have **gained an understanding** of the process (4 out of 5) and **felt confident** in the end (4 out of 5). Therefore, it can be said that AimX helped the participants to grasp the Xgoals definition process, especially accounting for the finding that they expressed **interest for utilizing the tool** in future design projects (4.5 out of 5) and that the design tool appears to have empowered them (4.4 out of 5).

This thesis has responded to the research question by establishing a design criterion (see 4.3) derived from previous studies, and creating and testing the experience design tool AimX. The newly created tool is first-of-a-kind and targets the definition process of Xgoals. From the evaluation process, the tool has been proven to be a valuable asset for designers, which empowers them to design for experience. It is the authors opinion that the AimX is worthwhile developing further into a tool to support designers to shift their mindsets towards experience-driven.

6.3 LIMITATIONS AND FUTURE STUDIES

The **mapping process** produced fruitful insights for the connection between Xgoals and PNs, however, this study has to be seen in light of some limitations. Firstly, this thesis acknowledges that due to the subjective and multifaceted nature of experience, any categorizations in their relation would probably not be reproducible or clear-cut. Secondly, during the structured discussions, no concrete context was provided for the Xgoals, thereby their interpretations were solely dependent on the participants. Thirdly, the saliency of each division's PNs relies upon the number of participants, so this mapping process might not have reached a decent number to provide more solid grounds for generalizations. As for future studies, a possible continuation of a similar mapping process with a concrete industrial context or design projects can provide the design research with more elaborate insights as to Xgoals/ PNs connection. Since this thesis investigated only one of the sources of Xgoals, another possible future study could focus on examining other sources and their relationship with Xgoals, in order to gain yet wider understanding of the wellsprings of Xgoals.

In regard to answering the **second research question** (RQ2), several limitations were identified. Firstly, the newly created tool only considers one of the sources for Xgoals, namely PNs. Thus, utilizing it in cases where another source of Xgoals is used, might provide obstacles. For this reason, in order to improve the tool to successfully work with all five identified sources (brand, empathy, theory, technology, vision (Kaasinen, et al., 2015)), further development is required. Secondly, the tool was evaluated with illustrative cases chosen by designers, which meant that all investigative activities for the definition of the Xgoals were done within the group and might have led to limited perspective. This limitation can be considered as a consequence form the COVID19 pandemic outbreak, which prevented the author of this thesis to execute the originally planned evaluation process, which included a design exercise with 60 bachelor working on real startup ideas. Thirdly, the employed sequence of steps used for defining Xgoals in AimX was decided upon by the author based on the notions that a start for definition would be the source of Xgoals. Future

studies should focus on the order in which the various experiential aspects are addressed, to provide the design research with an in-depth understanding that can aid future developments of design tools. Additionally, since the difficulties for designers to grasp the XFD field and its terms appears to be supported by previous research studies as well, it would be worthwhile to tackle this issue.

6.4 CONCLUSION

The quality of the experiences which our lives unravel, as a series of events, "**determines whether and to what extent life was worth living**" as experiences are the singular confirmation we all have of life (Csikszentmihalyi, 2014). XFD offers designers the chance to design for experiences and thereby design for the highest known design goal: happiness and human flourishing. Accounting for this ambiguous goal and the contemporary role of designers as "enablers of meaning" (Press & Cooper, 2016), design research is tasked to supply designers with tools and methods to enable the mindset shift form the traditional problem-solution to experience-driven. This is what this **thesis aspired** to contribute to. This thesis contributes to the XFD research field by revealing insights in regard to Xgoals/PNs relationship and developing a novel experience design tool for defining Xgoals.

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APPENDICES

Appendix 1: Experience goals assembly

Appendix 2: Experience goals mapping- Questionnaire

Appendix 3: Experience design tool AimX

Appendix 4: Instructions for AimX

Appendix 5: Consent form

Appendix 6: Feedback form

Appendix 1: Experience goals assembly

PLEASURE IN THE MOMENTARY EXPERIENCE

Sympathy is to experience an urge to identify with someone's feeling of misfortune or distress.
Admiration- to experience an urge to prize and estimate someone for their worth or achievement.
Worship - to experience an urge to idolize, honor, and be devoted to someone.
Dreaminess- to enjoy a calm state of introspection and thoughtfulness.
Desire- to experience a strong attraction to enjoy or own something.
Euphoria- to be carried away by an overwhelming experience of intense joy.
Amusement- to enjoy a playful state of humor or entertainment.
Enchantment - to be carried away by something that is experienced as overwhelmingly pleasant.
Fascination- to experience an urge to explore, investigate, or to understand something.
Anticipation- to eagerly await an anticipated desirable event that is expected to happen.
Inspiration- to experience a sudden and overwhelming feeling of creative impulse.
Energetic - to enjoy a high-spirited state of being energized or vitalized.
Relief- to enjoy a calm state of being free from mental or physical tension or concern.
Relaxation- to enjoy the recent removal of stress or discomfort.
Thrill - excitement derived from risk, danger.
Submission- being part of a larger structure.
Joy - to be pleased about (or taking pleasure in) something or some desirable event.
Love- to experience an urge to be affectionate and care for someone.
Simulation - an imitation of everyday life.
Expression- manifesting oneself creatively.
Surprise- to be pleased by something that happened suddenly, and was unexpected or unusual.
Satisfaction- to enjoy the recent fulfillment of a need or desire.
Captivation- forgetting one's surroundings.
Fantasy - an imagined experience.
Courage- to experience mental or moral strength to persevere and withstand danger or difficulties

PERSONAL SIGNIFICANCE IN EPISODIC EXPERIENCES

Exploration - to investigating an object or situation.
Sensation - excitement by stimulating senses.
Fellowship- friendship, communality or intimacy.
Competition - contest with oneself or an opponent.

Completion - finishing a major task, closure.
Nurture - taking care of oneself or others.
Confidence - to experience mental or moral strength to withstand or cope with the situation.
Challenge- testing abilities in a demanding task.
Humor- fun, joy, amusement, jokes, gags.
Pride- to experience an enjoyable sense of self-worth or achievement.
Respect - to experience a tendency to regard someone as worthy, good or valuable.

VIRTUE IN THE CUMULATIVE EXPERIENCE

Discovery- to find something new or unknown.
Hope- to experience the belief that something good or wished for can possibly happen.
Kindness is to experience a tendency to protect or contribute to the well-being of someone.

Appendix 2: Experience goals mapping- Questionnaire

Welcome to Experience design questionnaire

The aim of this questionnaire is to categorize collected experience goals* into the ten identified human psychological needs (Sheldon, 2001).

*Experience goal- positive emotions and experiences, used as goals directing the design process towards creation of meaningful products

This questionnaire consist of 39 questions, which require focus and deep thought, so I kindly urge you to take your time answering the questions.

Each question consist of Experience goal, such as Respect. And for every question there are set of 10 categories/ psycological needs (Autonomy, Comptence, and etc). Each category has a description of it's meaning. Your task is to identify in which of the categories (options) does the experience goal in question belongs to.

Note that one experience goal could belong to several categories or it might not fit either of them.
Try to stay objective to the descriptions provided in the questions.

....and finally, grab some post-its to aid you during the process and wirte down any thoughts you might have. Perhaps, you think that experience goal, such as Admiration, does not fit any category, or in your opinion it is a sub category of another.

Here are the 10 human psychological needs. Take a moment to read and familiarise yourself with them.

Competence- feeling that you are very capable and effective in your actions rather than feeling incompetent or ineffective

Autonomy- feeling like you are the cause of your own actions rather than feeling that external forces or pressure are the cause of your action.

Relatedness- feeling that you have regular intimate contact with people who care about you rather than feeling lonely and uncared of.

Self-actualizing- feeling that you are developing your best potentials and making life meaningful rather than feeling stagnant and that life does not have much meaning.

Security- feeling safe and in control of your life rather than feeling uncertain and threatened by your circumstances.

Money- feeling that you have plenty of money to buy most of what you want rather than feeling like a poor person who has no nice possessions.

Influence- feeling that you are liked, respected, and have influence over others rather than feeling like a person whose advice or opinion nobody is interested in.

Physical- feeling that your body is healthy and well-taken care of rather than feeling out of shape and unhealthy.

Self-esteem- feeling that you are a worthy person who is as good as anyone else rather than feeling like a "loser".

Pleasure- feeling that you get plenty of enjoyment and pleasure rather than feeling bored and understimulated by life.

1. Sympathy is to experience an urge to identify with someone's feeling of misfortune or distress.
Where does it belong in the following psycological needs?

2. **Kindness** is to experience a tendency to protect or contribute to the well-being of someone.

3. **Nurture** - taking care of oneself or others.

4. **Respect** - to experience a tendency to regard someone as worthy, good or valuable.

5.**Admiration**- to experience an urge to prize and estimate someone for their worth or achievement.

6. **Worship** - to experience an urge to idolize, honor, and be devoted to someone.

7. **Love**- to experience an urge to be affectionate and care for someone.

8. **Fellowship**- friendship, communality or intimacy.

9. **Submission**- being part of a larger structure.

10. **Expression**- manifesting oneself creatively.

11. **Dreaminess**- to enjoy a calm state of introspection and thoughtfulness.

12. **Desire**- to experience a strong attraction to enjoy or own something.

13. **Euphoria**- to be carried away by an overwhelming experience of intense joy.

14. **Joy** - to be pleased about (or taking pleasure in) something or some desirable event.

15. **Amusement**- to enjoy a playful state of humor or entertainment.

16. **Humor**- fun, joy, amusement, jokes, gags.

17. **Enchantment** - to be carried away by something that is experienced as overwhelmingly pleasant.

18. **Fascination**- to experience an urge to explore, investigate, or to understand something.

19. **Discovery**- to find something new or unknown.

20. **Exploration**- to investigating an object or situation.

Halfway through ... I know it is a long list of questions, which require you to dig deep. But take a 5 min break. You deserved it! You can continue digging after the break with a fresh mind ;)

21. **Hope**- to experience the belief that something good or wished for can possibly happen.

22. **Anticipation**- to eagerly await an anticipated desirable event that is expected to happen.

23. **Surprise**- to be pleased by something that happened suddenly, and was unexpected or unusual.

24. **Inspiration**- to experience a sudden and overwhelming feeling of creative impulse.

25. **Thrill**- excitement derived from risk, danger.

26. **Sensation**- excitement by stimulating senses.

27. **Energetic**- to enjoy a high-spirited state of being energized or vitalized.

28. **Confidence**- to experience mental or moral strength to withstand or cope with the situation

29. **Challenge**- testing abilities in a demanding task.

30. **Competition**- contest with oneself or an opponent.

31. **Completion**- finishing a major task, closure.

32. **Relief**- to enjoy a calm state of being free from mental or physical tension or concern.

33. **Relaxation**- to enjoy the recent removal of stress or discomfort.

34. **Satisfaction**- to enjoy the recent fulfillment of a need or desire.

35. **Courage**- to experience mental or moral strength to persevere and withstand danger or difficulties

36.**Simulation**- an imitation of everyday life.

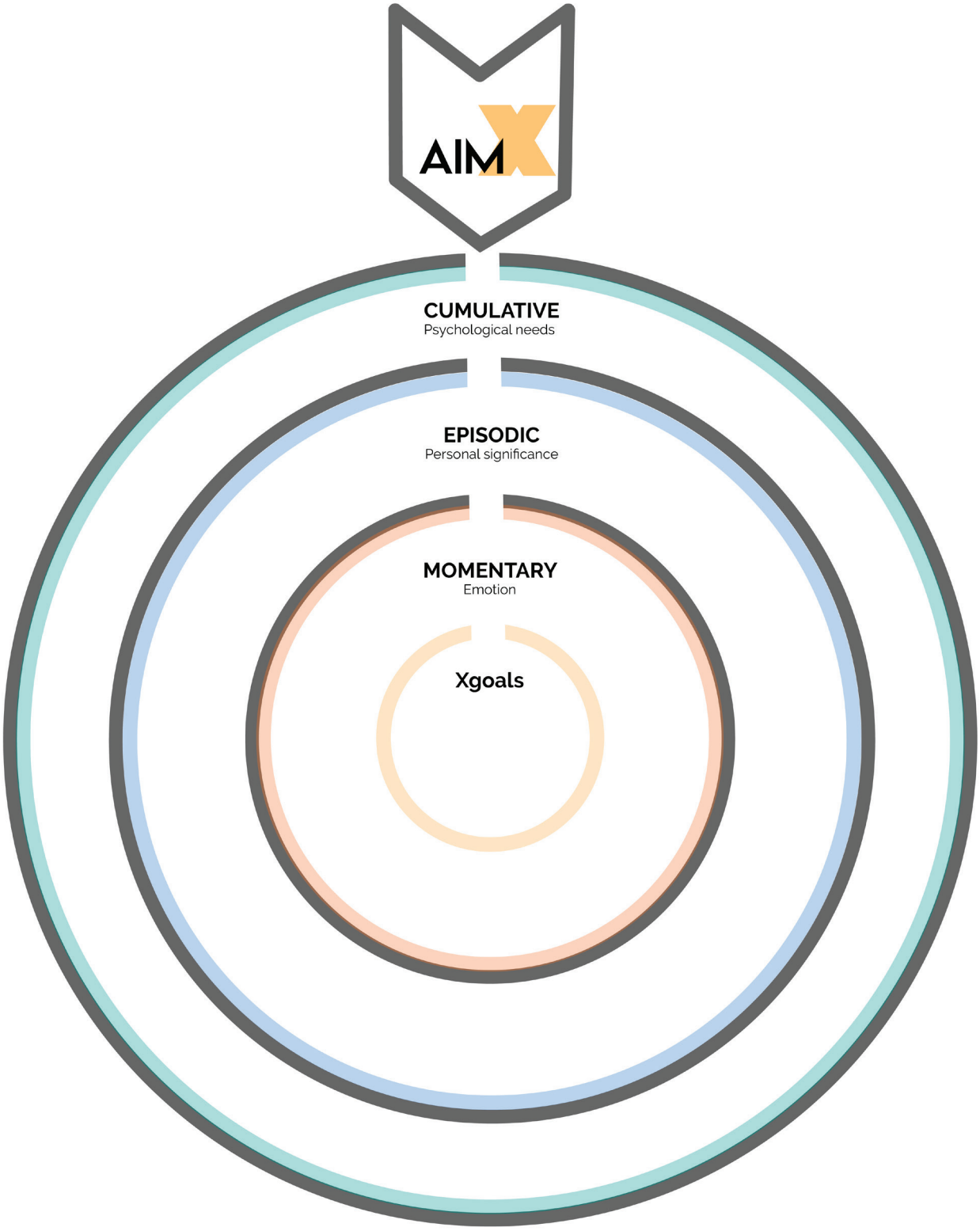
37. **Captivation**- forgetting one's surroundings.

38. **Fantasy**- an imagined experience.

39. **Pride**- to experience an enjoyable sense of self-worth or achievement.

Thank you for your inputs, they are greatly appriciated!!!

Appendix 3: Experience design tool AimX



Appendix 4: Instructions for AimX

Instructions for AimX

• First and foremost, it is crucial to remember that during the Xgoal definition process, only experiential matters should be considered while leaving behind other goals, such as aesthetic, material, usability requirements, etc. The focus of this tool is to define the experiences the a project would aim for, not to consider what would be designed or how that would be done.
Experiences are all around, all the time, everywhere and they are all the evidence one has from life.
They are subjective, context-dependent and dynamic.
Xgoals are "conceptual instrument that concretizes intended momentary emotion or the meaningful relationship/bond that a person has with the designed product or service." (Lu, 2018)
• Similar to the double diamond structure, there is no convergence without a divergence first. Therefore to define Xgoals, the first step is to explore the experiential domain. Investigating the experiential aspects starts from the outer circle and follows the direction of the arrow towards the center of AimX.
Where the main aim, defining the Xgoals, is positioned at the core and will be addressed last.
Designers can start by writing down possible Xgoals in each circle and explore the circle spaces individually.
Design for Happiness Deck is also available to aid this exploration phase, since it contains cards for all three categories and provides useful definitions which can help designers to establish a common understanding of the terms.

Step 0/ Context
The design brief, problem statement, challenge, or simply stated, context is the one that can provide insight to initiate the Xgoal definition process. For instance, empathizing with potential users or clients can shed light as to what the current situation is and what they are thriving for. This valuable information can act as a guiding light through filling the AimX design tool.

Step 1/ Cumulative/ Psychological needs
This outer circle is concerned about the universal human psychological needs, since

people, as a source of Xgoals, give the meaning of the experiences. They are needs, which all humans strive for and fulfilling them is directly linked to happiness.

Step 2/ Episodic / Personal significance

The episodic circle in the AimX design tool addresses personal or group goals and aspirations. Short or long-term goals that hold personal value or points of improvement and growth (e.g., positive self-evaluation, transcendence).

Step 3/ Momentary/ Emotion

This circle space aims to define the momentary positive emotions (i.e. relaxation, euphoria), which are to be involved in the design project.
(Note: It is possible to follow a different order for the above-mentioned steps)

Step 4/ Combine and formulate Xgoals

After exploring all circles and having in mind the design context, designers can start combining the three levels together by using proposition words (e.g., for, towards, in, …). It is recommended to try various combinations before settling on the final Xgoals.
Examples:
Relaxation for self-esteem in spa hotel rooms
Pleasure through euphoria and positive self-evaluation

Step 5/Finalize a set of Xgoals

As a final step, the selected and formulated goals are compiled in a final group of Xgoals, which will act as a driver for the upcoming design activities, such as ideation.

Appendix 5: Consent form

Design tool test consent form

Please read and sign this form. In this test:

- You will be asked to perform certain tasks in order to test the developed design tool (AimX) for a Master's thesis for Aalto University.

- In addition to the given tasks a loose interview questions might be involved during the process and photographs will be taken. The photographs are primary to document the conducted test or for later observation purposes. Photos that can identify you as you will not be included in the final thesis work.

Participation in this test is voluntary. All information will remain strictly confidential. The descriptions and findings may be used to further improve the design tool. However, at no time will your name or any other identification be used. You can withdraw your consent to the experiment and stop participation at any time.

If you have any questions after today, please contact

'Paula Saratlieva at paula.saratlieva@aalto.fi

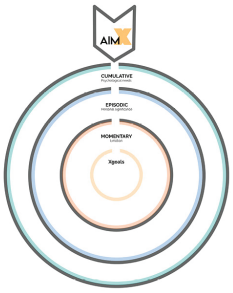
I have read and understood the information on this form and had all of my questions answered

_____ _____

Subject's Signature Date

Appendix 6: Feedback form

AIMX



Date:_____
Age:_____
Gender: M F
Profession:_____

How would you describe AimX using only 1 adjective?

The process of filling the AimX sheet to me was...

Painful	○——○——○——○——○	Enjoyable

After using the AimX I feel..

Not empowered	○——○——○——○——○	Empowered

When I first saw the AimX sheet I felt...

Not intrigued	○——○——○——○——○	Really Intrigued

The visual representation of the design tool supports the process.

Strongly disagree	○——○——○——○——○	Strongly agree

The AimX target illustration offers the space explore within the realm of experience

Limited	○——○——○——○——○	Explorative

The AimX target illustration helps me track my own process.

Untraceable	○——○——○——○——○	Traceable

Which part of AimX did you find most challenging? Why?

I found the AimX design tool to be…

Complicated ○——○——○——○——○ Simple

Learning to use the design tool proved to be…

Challenging ○——○——○——○——○ Effortless

How confident you are about learning to use AimX?

Not confident at all ○——○——○——○——○ Very confident

Do you have previous experience with setting XG?

○ NO ○ YES

What kind of process for setting the XG have you used before?

Compared to the process I have previously used, AimX has proven to be..

I have gained an understanding of how to design for experiences

Strongly disagree ○——○——○——○——○ Strongly agree

I find this design tool to be useful for my own design process

Useless ○——○——○——○——○ Very useful

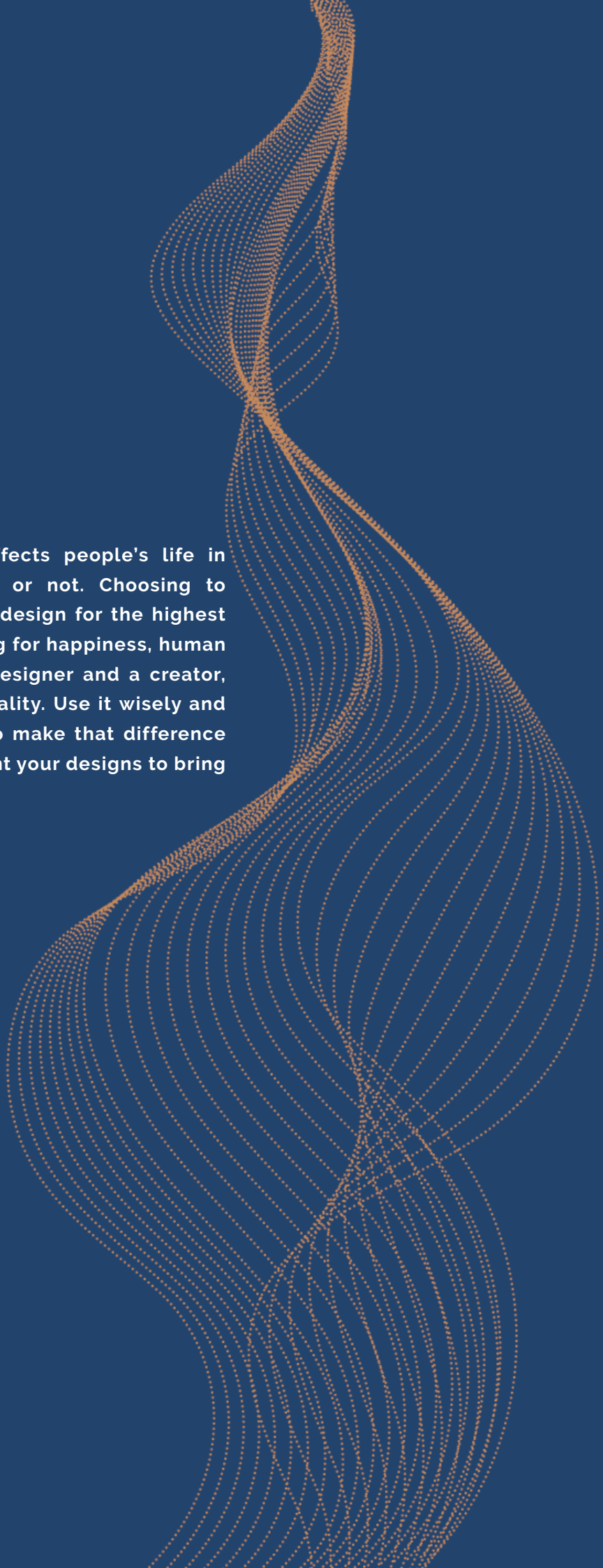
How did the XG that you set influenced the ideation phase?

I can see myself using this tool for future design projects

Strongly disagree ○——○——○——○——○ Strongly agree

I like AimX because....

I wish AimX ...



What you design matters and effects people's life in various ways whether intentional or not. Choosing to design for experiences enables to design for the highest design goal known so far- designing for happiness, human flourishing, and well-being. As a designer and a creator, you hold the power to make it a reality. Use it wisely and purposefully. Wouldn't you want to make that difference in someone's life? Wouldn't you want your designs to bring users happiness and fulfillment?

Paula Saratlieva

Aalto University